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ZILLIONS OF BASIC AND ADVANCED *TIPS, TRICKS AND SHORTCUTS*, LOGICALLY ORGANIZED AND FULLY INDEXED

Arthur Naiman, Nancy E. Dunn, Susan McCallister, John Kadyk and a cast of thousands

It's been a long time since I have seen a book this good. Marvellously organized.

Eric Anderson, Wired Librarian's Newsletter

Should be on the bookshelf of every owner—or potential owner—of Macintosh computers. It may be the only reference book you'll ever own that you can keep reading page after page. *Karlynn Carrington, Hartford Courant*

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Art Kleiner, Personal Computing

Excellent. Written simply, concisely and comprehensively. An essential book for all Macintosh users.

Stewart Price, Apple Business (London)

A must read for Macintosh users if there ever was one.

Computer NewsLink

If there's anything they should bundle with each and every Mac, it's a copy of The Macintosh Bible. It's so well written you could easily read it from front to back like any good book.

I was impressed by the deft skill with which [it] puts technical matters into clear terms.

One hell of a good book. *Tony Rocco, MicroTimes*

For readers' comments, see pages 1234–41.
For reviews, see the back cover and the front and back of the book.

Superb. *David Pogue, The Mac Street Journal*

Excellent. *Step-by-Step Electronic Design*

Rating: A. *Computer Book Review*

Wonderful. *Gail McGovern, MacNexus*

A must-have. *Sylvia Hanna, V.I.S.T.A.*

Indispensable. *Patrick Dewey, Booklist*

Rating: 95 out of 100. *Doug Miles, MacGuide*

Great work! Keep it up. *Jim Eason, KGO radio*

The best Mac advice around. *Jay Bail, The Book Reader*

Witty and fascinating. A real bargain.
Macintosh Video News

Pertinent, pithy, to-the-point. A bargain.
A-E-C Automation Newsletter

We love this book and highly recommend it.
Wendy Woods, NewsBytes

Well done. Contains a lot of things I didn't know.
Andy Hertzfeld, Macintosh programming legend

It may be the only book on the Mac you'll ever need.
PD Mac Update

I loved the book! Everyone who owns a Mac should have it.
Bob LeVitus, The MACazine

Interesting, amusing and enlightening. Filled with insights.... Entertaining enough to read for its own sake.
Marion Delahan, Slightly Used Review

You come away with something useful every time you open the Bible. The book covers an amazing range of subjects, in Naiman's amusing, un-nerdy style. Just may be the resource you've prayed for. *In House Graphics*

Well organized and well written. If you're new to the Mac, The Macintosh Bible is an excellent reference to own.
Gordon Firestein, Bay Area Mac Classifieds

Known for its opinions, trivia and amusing asides, but it's nevertheless crammed full of information. There's probably no other way to get so much information on so many Mac software packages in one place.
Information Center

[An] enormous amount of information that is lucidly explained. Any school that uses Macintosh computers or any library where there will be an interest should seriously consider this book.
Kliatt Young Adult Paperback Book Guide

For readers' comments, see pages 1234–41.
For reviews, see the back cover and the front and back of the book.

The Macintosh Bible Fourth Edition

thousands of basic and advanced
tips, tricks and shortcuts
logically organized and fully indexed

Arthur Naiman, Nancy E. Dunn,
Susan McCallister, John Kadyk
and a cast of thousands

A Goldstein & Blair book from
Peachpit Press

This edition of The Macintosh Bible is dedicated to the people of East Timor whose seventeen-year struggle for independence has been virtually ignored by the media despite the murder of perhaps a quarter of the population

(for more information, call 914 428 7299 or 604 264 9973)

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You'll find contact information for many of the people listed here in Appendix B.

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Trademark notice

Because a major purpose of this book is to describe and comment on various hardware and software products, many such products are identified by their tradenames. In most—if not all—cases, these designations are claimed as legally protected trademarks by the companies that make the products.

It is not our intent to use any of these names generically, and the reader is cautioned to investigate a claimed trademark before using it for any purpose except to refer to the product to which it is attached. In particular: *Apple* and *Macintosh* are registered trademarks of Apple Computer, Inc. *The Macintosh Bible* is a trademark of Goldstein & Blair, licensed to Peachpit Press, Inc., neither of which is affiliated with Apple Computer, Inc.

Disclaimer

We've got to make a disclaimer that common sense requires: Although we've tried to check all the tips, tricks and shortcuts described in this book to make sure they work as described, we can't guarantee that they do. Don't try anything except on a backup file. Satisfy yourself that the technique you're trying works before using it on your valuable files.

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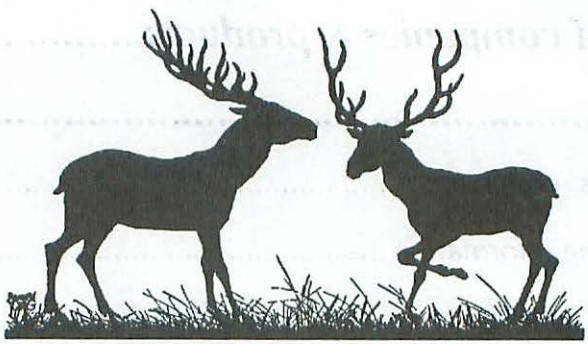

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Preface (AN)

Most computer books are out-of-date a few months after they're published. But not this one. To keep the information in it current, three *free* 30-page updates are included in the price of the book. To get them, all you have to do is send us your name and address. (It's easiest—but not required—to use the card that's just inside the back cover.)

This fourth edition has been *completely* revised and updated, and contains 800 pages of new material. Few books that are published for the first time have half as much new material.

The Macintosh Bible is a reference book and isn't meant to be read from beginning to end—although we keep getting letters from readers that say, *once you start reading it, you can't put it down; as good as curling up with a good novel;* and *I've read it from cover to cover—twice!*

Naturally, we'll be delighted if you have the same reaction; if not, use the table of contents and the *very* complete (11,000-line!) index to dip into the book wherever you want. There's also a 642-word glossary, to help you with unfamiliar terms (it could be a small book all by itself).

But first read *How to use this book* (pp. 17–23), so you have an idea of how the book works and how it's organized. And if you're new to the Mac, check out the *Guide for beginners* that begins on p. 57. We've worked hard to make it logical and clear.

If you've owned previous editions of *The Macintosh Bible*, you may find the *Introduction*, which starts on the next page, interesting. (If you're new to this book, however, your reaction may be, *what in the world is he blathering on about?)*

We also offer a selection of the best freeware and shareware programs available on the Mac; it's called *The Macintosh Bible Software Disks*. Now in its fourth edition, this three-disk set is described on pp. 995–96.

Introduction (AN)

It's a common saying that the best source of tips is the manual that comes with a product. To this is often added a mild reproach: "if only people would take the trouble to read it." Well *of course* manuals contain a lot of good tips. There are also a lot of needles in that haystack over there. The trick is to *find* them.

The typical manual buries its useful information beneath tons of idiotic over-simplification *(lift your hand into the air, using your arm and shoulder muscles, and lower it onto the mouse, palm down)*, ridiculous warnings *(do not grasp the back of the picture tube with the power on and jump into a bathtub full of water)* and unintelligible computerese *(Guess is an optional argument that specifies the starting value of the iteration*—this last, as you may have guessed, is an actual quote from a manual).

You have better things to do with your time than read hundreds of pages of this sort of stuff every time you want to use a new product. So we've tried to do some gleaning for you.

Needless to say, we can't cover the ground we do and still do a comprehensive job in each area (although the size of the book shows you we tried). It's inevitable that some areas will be covered more thoroughly than others. Still, within each area, we've tried to be selective and concentrate on the most useful stuff.

Several people complained about the font we used in the three previous editions of *The Macintosh Bible*—the sinuous and sensuous Benguiat (see Chapter 6). So I looked at *lots* of other fonts.

I finally decided on an oldie but goodie called Bookman, which has a similar look to Benguiat (not surprisingly, since it was designed by the same person). It's not as trendy as Giovanni or Centaur or Poppl-Pontifex, but it's got the right blend of readability, eccentricity, sensuousness, personality, elegance, friendliness and beauty (R-E-S-P-E-F-B, tell you what it means to me).

Bookman is less quirky and more accessible than Benguiat, but it's also less stylish and exotic. Each of these fonts has its own advantages, but I thought I'd try Bookman for this edition to see how it works, and how you all like it. To let me know what you think, write I Font to be Alone, G&B, Box 7635, Berkeley CA 94707.

If you've bought earlier editions of this book, you probably know that I published them myself (well, hardly *myself*—by the end we had more than twenty employees—but with the company I started, Goldstein & Blair). If you've always wondered where the name Goldstein & Blair came from, this is your lucky day. (I feel a digression coming on.)

George Orwell's wonderful novel *Nineteen Eighty-Four* tends to be underappreciated now that it's become assigned reading in high schools. (That's the kiss of death, because people are forced to read things before they're really ready for them. I remember discovering as an adult that some early Wordsworth is great. "How can that be?" I thought. "We read Wordsworth in high school.")

Anyway, in *Nineteen Eighty-Four,* Emmanuel Goldstein is the head of the underground—the guy who gets hated in the Two Minutes Hate, the author of the book Winston Smith eventually gets busted for reading. As for Blair, that's the name George Orwell was born with—Eric Blair. He took his pen name from a river he loved—the Orwell, which flows past Ipswich in Suffolk, northeast of London.

Goldstein & Blair started off as the *imprint* (publisher's name) I planned to use for my political books. But the computer books arrived first and I couldn't think of a good imprint for them. The Goldstein & Blair *dba* ("doing business as" registration form) was just sitting there, so I used it.

Then when I finally got ready to publish political books, I had to think up a new name for *that* company. (The people at G&B who were selling the computer books didn't want me to bring out both kinds of books under the same imprint—understandably.) I decided to call it Odonian Press, a name that comes from Ursula Le Guin's wonderful novel *The Dispossessed.*

Although Goldstein & Blair was very good to me financially, I felt enormously burdened by the effort it took to run it, and by not having time to do anything else. I'd gotten into publishing in the first place because I couldn't stand how clueless and/or sleazy most publishers were (not *all*, but most). The problem was: where could I find someone to take over my business who would be creative enough to understand how G&B books should be marketed, and competent enough to follow through on the details?

I only talked to one company—Peachpit Press, publisher of the best-selling *Little Mac Book* and more than 60 other titles. Peachpit was founded by Ted Nace about the same time I founded G&B (around 1986–87) and with the same goal—to empower authors. Like me, Ted has both written books and published them. Unlike me, he prefers publishing, and therefore does a much better job of it.

So we made a deal, and Peachpit began distributing *The Macintosh Bible* and all other Goldstein & Blair titles in early 1992. I and my colleagues here at G&B will continue to edit future editions of *The Macintosh Bible*—and the updates—but Peachpit will publish them. (We'll design everything too, and give Peachpit camera-ready pages, which makes G&B a book *packager.)*

This change is good for you as well as me, because the people at Peachpit are very bright and good at what they do. (You're probably wondering where the name Peachpit came from. I always imagined a hippy-dippy scenario—you know, everyone sitting around stoned eating peaches and suddenly someone says, "Hey, why don't we call it...." Actually, "the peach pit" was a peach-colored house—apparently not too neat, to judge from its name—that Ted was living in when he started the company.)

Now that I've finished this edition of *The Macintosh Bible* and put it into Peachpit's competent hands, I'm off to write the Great American Political Tract...no, wait, Tom Paine's already done that—I'll have to think up another project. Well, I'm sure I'll find *something* to do until it's time for the next edition.

Till then, remember: *This is the Mac. It's supposed to be fun.*

How to use this book (AN)

From the second chapter on, this book is made up of little chunks called *entries*, whose titles look like this: ***entry title***. Entries are grouped into *sections*, whose titles are in black bars, like the one above.

In general, entries are meant to stand on their own, although we've tried to organize them into subject areas within the sections. We've also tried to put them into logical order and, wherever possible, put the more basic entries toward the start of each section.

This book covers a wide range of Mac experience. No matter how much or how little you know, there will be stuff that's either too easy or too hard for you. So just skip anything that obviously isn't meant for you—there'll be plenty that is.

Margin icons

One way we help you find items you're likely to be interested in is by putting *icons* (small graphic symbols) in the margins. There are twelve of them:

mostly for beginners

If you're new to the Mac, it might make sense for you to check out all of these entries first. (They're listed in the index.) This icon usually refers to an entire entry or page, rather than just to a single paragraph.

mostly for power users

At the other extreme, this icon is for people who eat RAM chips for breakfast.

very hot tip

All our tips are hot, but these tips are *really* hot.

shortcut

Isn't this a beautiful icon? It's from the WetPaint clip art collection.

We're critical enough when that's what's called for, so we also like to give credit where credit is due.

These two icons are a subtle plug for left-handers, and have been feminized for this edition. (Actually, the jockey in the shortcut icon is a woman—always has been—but the icon is too small to tell. And the horse is a mare. So don't get on my case, OK?)

Bugs are unintentional, unanticipated occurrences—as opposed to misguided but intentional design flaws, which get the previous icon. (This fabulous icon was designed by Tom & Joel Friesch.)

Good is good, but good and cheap is even better.

You won't die—usually—if you ignore this icon, but you'll be a lot happier if you don't.

Nobody can predict the future, but we try. (Since we're not afraid to be wrong, it's not a problem.)

This icon is for stuff that's more interesting than useful. Look for it when you need a break.

Tom Friesch and I cooked up this new icon—isn't it great? (I wanted to feel even freer to indulge myself.) You'll see a lot of these in the front of the book, but don't panic—they die down after Chapter 1.

Now that we've shown you the icons, let's widen the margins and start using them.

How to find what you're looking for

The table of contents (on pp. 6–11) shows chapter and section headings; it's one good way to find your way around the book. I generally prefer to use an index, and the attention lavished on ours reflects that fact.

Compiled by master indexer (and enlightened being) Ty Koontz, it's a *real* index, not one of those fake ones that's just there so the publisher can say the book is indexed. It's not only possible to find what you're looking for in our 140-page index—it's virtually impossible *not* to.

very good feature

Although we always try to define terms the first time they're used in the text, you may still run across ones you're not sure of. If that happens, turn to the glossary. Don't say, *Oh, yeah, a glossary, OK.* We worked *very* hard to make it as useful and complete as possible. (It's Appendix A, all 70 pages of it.)

very good feature

Appendix B lists addresses and phone numbers for the products and companies mentioned in the book, as well as some of the Mac experts who contributed to it.

Product evaluations

Product evaluations are an important part of the book but you have to take them with a grain of salt, if for no other reason than that they may be out-of-date by the time you read them. (That's what the updates are for, so be sure to send for your free copies.)

important warning

A certain amount of subjectivity is bound to creep into product evaluations; in an attempt to combat that, we've sometimes had more than one person review, or comment on, a product. We recommend what we think are the best products, but we give you tips on the most popular, whether we like them or not, since they're the ones most people use.

Prices and names

Prices, when shown, are just to give you a *very* general idea of what things cost, at list, as of this writing. Prices change rapidly and discounts are almost always available, so don't rely on the prices we quote. Since this book is written for people with IQs in *three* figures (the sort who are unlikely to say, *Oh, it's only $995? What a relief! I thought I was going to have spend at least a thousand dollars),* all prices are rounded up.

Since it isn't our job to sell the stock of computer companies, we normally refer to programs the way people do when talking—e.g. *Word* instead of *Microsoft Word.* And we generally leave version numbers and names off—*FileMaker,* for example, instead of *FileMaker Pro*—since that's also what people do when talking. (Of course, when we're referring to something that's peculiar to a specific version of the software, we do give the version number or name.)

In the interest of preserving the readability of English for future generations, we normally limit companies and products to three capital letters and/or exclamation marks per name. (It was either that or change my name to *ArtHurNAIMAN! Pro.)*

One final word about terminology: There's an ignorant trend afoot to call all personal computers—even Macs!—*PCs,* as if there were something wrong with the simple and straightforward word *computers.* The people who use *PC* that way tend to be the same ones who talk about *software programs*—as if you needed the word *software* to distinguish a program running on your computer from, say, a television program or a drug rehabilitation program. (Come to think of it, if we're warring on drugs, why are we spending all this money rehabilitating them?)

Maybe they feel that the *P* in *PC* helps make it clear that you're referring to a personal computer and that without that qualification, you might ask someone what kind of com-

puter they use at home and get an answer like, "Do you mean my *personal* computer or the Cray in the basement?"

This is all by way of saying that—in this book—*PC* refers to an IBM PC or compatible computer, not to a Mac.

PC-bashing

Throughout this book, I have some rather uncomplimentary things to say about the user-sadistic, brain-dead interface of MS-DOS and of many of the programs written for PCs. Please understand that I don't mean to be denigrating PCs (which are sometimes better values than Macs) or PC users (who are often doing the sensible thing by working on PCs instead of Macs).

I'm simply against the primitiveness of the MS-DOS user interface, and in favor of making computers fun to use. I don't mean to side with one computer manufacturer—or user—against another.

In any case, MS-DOS is slowly disappearing as more and more people start using Windows (a PC-based imitation of the Mac's user interface that has improved to the point where it's maybe 80% as good as using a Mac). And now that Apple and IBM are allied, PCs are bound to get more and more Maclike and easy to use.

Key caps

We use keycap symbols (⇧⌘W) throughout the book to make it easier for you to locate keyboard shortcuts for commands. We always show the keys in the order in which they're arranged on Apple's standard keyboards—so you don't sometimes see Option⇧⌘A and sometimes ⇧⌘OptionA (except when a contributor prepared a diagram with them the other way and we didn't have time to change it). This makes it easier for you to put your fingers down on the keys left to right as you read a command in the book.

On early Macs, the command key looked like this: ⌘; on your keyboard, it still may. But on the keyboards Apple is currently selling, it looks like this: ⌘. Since most of you are probably using the current keyboards, ⌘ is the symbol we've chosen to indicate the command key.

Some third-party keyboards simply label the command key with the word *command* and don't even put the ⌘ or ⌘ symbols on it. *O tempora! O mores!* (Who says computer books can't be literate?) In any case, whatever's printed on your command key, just hit it when you see ⌘ and everything will work out fine.

We show characters in keyboard combinations as capital letters (A B C), which is how the keys are labeled on the keyboard. But you don't actually need to press the Shift key—unless we specifically indicate that you should.

Sometimes we show a key with both the shifted and unshifted characters on it: 0. We do that to make sure you know we're referring to—say—the zero key on the keyboard (as in this case) and not the letter O or the zero key on the numerical keypad.

Who wrote what

The name or initials of whoever wrote the initial draft for each entry (or section) appears in parentheses after its title (to find out who's who, see *Notes on major contributors* on pp. 27–28). When I add a comment to someone else's entry, it's in italics, enclosed in square brackets and signed *AN*. Comments by other contributors follow the same format.

Regardless of who wrote the original drafts, I rewrote them with a very heavy hand, to try to make the whole book speak with one voice (mine, for better or worse). So if something's incorrect—and isn't a typo—it's the fault of the person whose name or initials follow the entry title—myself included. But if something's *unclear*, it's my fault, regardless of whose name or initials appear there. Naturally except but other than whether not it be—oh

my God, I'm doing it already. (If the jokes aren't funny, that's my fault too.)

Submitting tips

If you'd like to contribute tips to future editions of *The Macintosh Bible*, you can mail them to us at Goldstein & Blair, Box 7635, Berkeley CA 94707, or send them to *Mac.Bible* on AppleLink or *Mac Bible* (or c/o the *Macintosh Bible/Peachpit* forum) on America Online.

We don't pay for unsolicited tips, by the way. It's not that we begrudge you the money, but once we put material from different sources through our editorial blender, and add our own opinions, it's virtually impossible to calculate who's owed what in any fair way—not to mention the logistical nightmare of trying to keep track of it all (it's bad enough with our 79 regular contributors).

You're offended that we even mentioned filthy lucre, aren't you? You understand that the prestige of having your name in *The Macintosh Bible* is compensation enough for a hundred lifetimes. (You *do* understand that, don't you?)

We're happy to get tips from vendors as well as individuals, but please don't send us press releases or product information online—or, God forbid, by fax. We prefer to get stuff like that by mail. (For more on this, see the entry on fax abuse in Chapter 17.)

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Chapter 1

First principles

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The Ten Commandments (AN)

I. This is the Mac. It's supposed to be fun.

For years, many businesspeople treated the Mac as a toy, while those of us who'd already had a bellyful of the deranged command structure of more primitive computers romped happily in the fields of Macintosh. Now the Mac has gotten some corporate acceptance and Windows has made the PC much more like the Mac. Both developments are basically good, but there's a risk that they'll engender a lifeless, "businesslike" homogenization of how personal computers relate to their users.

The rigid dichotomy between work and fun—and the acceptance of that dichotomy as inevitable and necessary—is, to quote The Firesign Theatre's Dr. "Happy" Harry Cox, "Old Age thinking." More clearly than any other computer, the Mac demonstrates that aesthetics enhance, rather than detract from, efficient work.

So don't let them turn the Mac into an expensive version of the PC, or the PC into a clumsy, bloodless imitation of the Mac. Demand fun as your birthright!

II. Easy is hard.

There's a macho attitude among some computer jocks (although certainly not among the best of them) that the harder something is to deal with, the more advanced it is. Actually, of course, it's very hard to make things easy. The more work you put into something, the less work the person who uses it has to do.

So if you find yourself beating your head against a wall erected by someone's laziness (or greed), look around for a

different wall that someone else took the trouble to put a door in. And if anybody mocks what you're using as a toy, just smile and say, "Easy is hard. Hard is primitive."

III. It's not your fault you're confused.

Over the years, manuals have gotten better and programs are designed more sensibly than they used to be, but that's a little like saying how much nicer Himmler has been since his lobotomy. Often the problem is expertosis (the inability of experts in a given field to remember what it's like not to be an expert). Sometimes it's simple money-grubbing. In any case, the thing to remember is this:

If you're confused, it's not because you're stupid—it's because the people who designed that product, or wrote that manual, or rushed their employees so they couldn't do a good job, are stupid. Just make sure they, not you, pay for it.

IV. You can't do it all.

Some experienced Mac users can make you feel like a loser because you're not up on the new products and techniques they're always discovering. But it's really just that you have different interests. Theirs is exploring the Mac and yours—if you're like most people—is simply using it.

Each approach has its virtues and neither is inherently superior to the other. So feel free to restrict yourself to a small number of Mac programs that you master and use intensively. Remember—you can't do it all—nobody can—so don't feel guilty about not trying.

V. Make the Mac your own.

There's never been a computer you could, as Omar put it, "remould...nearer to the Heart's Desire." So give yourself time to customize your Mac. Find the software you like best. Spend hours rearranging the desktop or the files on your disks. The more the Mac feels like your own creation, the more efficient and enjoyable your work on it will be.

Think of the Mac as your home. You wouldn't try to move every different piece of furniture in the world into your home, just because you could. You have furniture you feel comfortable with, appliances you need and use, decorations and toys that amuse you. Treat your Mac the same way.

IV. A file saved is a file saved.

What shall it profit you if you create the greatest piece of work in the world but lose it because you forgot to save?

Despite how wonderfully easy it is to use, the Mac has as many traps and pitfalls as any other computer—maybe more. These don't have to be a problem, if you save your work! Of course it's a pain and interrupts the flow of your thoughts, but that's nothing compared to what it feels like to lose work.

People are always telling you to save, as if it mattered to them. It's too bad saving has acquired this taint of moralism. Saving your work isn't something you should do because some authority tells you to. The appeal here is pure pleasure principle—you'll be a lot happier if you get in the habit.

VII. Two, three, many backups.

Saving is only half the battle. Disks crash all the time. If you don't make regular backups, you may as well not save your work at all.

VIII. Combat the tragedy of the commons.

In English villages, the "commons," or "common," was a piece of land on which everyone could graze livestock. (That's what the Boston Common originally was.)

It's clearly in each villager's individual interest to graze as many head of, say, sheep on the commons as he or she can. And yet if all the villagers follow their own best interest, the commons gets grazed bare and all the sheep starve. This is called "the tragedy of the commons."

The solution, of course, is simple: limit the number of sheep each villager can graze (hopefully in some sort of equitable way). But that can be hard to enforce since, even when a quota exists, it's still in each villager's individual interest to graze as many sheep as possible on the commons. It requires some social and environmental consciousness on the part of all the villagers, some long-range, unselfish thinking, to avoid the ecological catastrophe.

Just the same thing is true on the Mac. It's no big deal if one person doesn't pay for a shareware program, but if a lot of people don't, good shareware stops getting written. It's no big deal if one person copies a commercial program and uses it for free, but if a lot of people do that, software developers have trouble making money and start cutting corners. In both cases, slowly but surely, the commons becomes a barren patch of dirt.

IX. Allow for Murphy's Law (since you can't avoid it).

Here's a piece of trivia few people know—the origin of Murphy's Law. In 1949, Captain Ed Murphy was an engineer working

at Edwards Air Force Base in California. When a technician working in his lab miswired something, Murphy said, "If there's any way to do it wrong, he will." A co-worker of his, George E. Nichols, dubbed this Murphy's Law.

Murphy's Law has evolved into, "If anything can go wrong, it will," but it's interesting to note that it originally referred to incompetence, not to some sort of impersonal malevolence on the part of the cosmos.

But here's the clincher—that anecdote itself is an example of Murphy's Law, as Duane Olesen of Houston explains:

"Your story about Captain Ed Murphy may be accurate, but it was not the first use of the expression. Way back in 1946... the term was already in use. As a matter of fact, we had a kid in my class [in the Navy] who had the misfortune to have the name Murphy. Whenever something went wrong, he was automatically blamed....

"Later, in 1948, when I started college, the Dean of Engineering asked a group of us freshmen if we had heard of Murphy's Law. Most us that had been in the service knew about it."

You know, maybe <u>any</u> explanation of the origins of Murphy's Law is bound to be wrong, just by the nature of what it's explaining. We could call this Murphy's Meta-Law.

In any case, things certainly do go wrong with distressing regularity. This happens less on the Mac than elsewhere, thanks to the care and dedication of its original designers. In fact, the Mac's ease of use can lull you into the dangerous delusion that Murphy's Law has been banished from its realm.

No sooner do you assume this than reality disabuses you of the notion—usually more abruptly than you'd like. It works sort of like the Greek concept of hubris: Pride—or, in this case, complaisance—goeth before a fall.

X. That goes double for Sturgeon's Law.

In the late '50s, Theodore Sturgeon (1918–85) wrote a book-review column for a magazine called Venture Science Fiction. It was there he first enunciated Sturgeon's Law. "It's well known," he wrote (I'm paraphrasing), "that 90% of all science-fiction writing is crap. But then, 90% of everything is crap."

When I first started writing about computers, I wasted a lot of time railing at some of the more wretched products popular back then, and at the brain-damaged ways they went about things. Today, you hardly ever hear their names. (In Bach's day, Hasse's music was more popular than Bach's. You remember Hasse, right?)

Natural selection is going on at a blinding pace in this field, so just find some good stuff, use it until something better comes along and forget about the rest.

The trick, of course, is finding the good stuff. That's one of the things this book is designed to help you do. So stop browsing and buy it already. (This is the famous Lost Eleventh Commandment.)

Software buying tips (AN)

This book is filled with specific evaluations and comparisons of Mac programs. What follows here are some general guidelines on what to look for and avoid.

Against stupidity, the gods themselves struggle in vain

When Schiller wrote that line (in his play *The Maid of Orleans* in 1801), he probably wasn't thinking specifically of software companies. But he might as well have

been. Most of them don't have the brains God gave a slice of French toast.

For example, almost all of them have installed computerized call routing. You call up—hoping against hope to speak to a human being (what the hell, you've always been a crazy optimist) and a canned voice tells you to press 1 if you have a touch-tone phone.

Don't do it! It's almost always better just to sit there on the line until the computer stops blathering at you and connects you to a real person. (Soon, no doubt, there will be a way they can tell whether you actually have a touch-tone phone, and you'll run the risk of being arrested by the Federal Communications Police for fraudulent rotary phone impersonation. But for the time being, you're safe.)

If you do fall into the trap of telling them you have a touch-tone phone, you're stepped through a multiple-choice maze: *If you're calling about DorkMaster on the PC, press 1. If you're calling about DorkMaster on the Mac, press 2. If you've ever known lust in your heart, press 3.* And on it goes, each question more petty and irrelevant than the last.

Computerized call routing is sometimes called *voice mail*, but that's a base slander. Voice mail is actually a wonderful system that lets you leave a message for someone in your own voice, instead of having to tediously dictate it to some third party—which isn't very efficient, as we all know from the childhood game of *telephone* (where you whisper messages around a circle).

Not that voice mail can't be made irritating too. I particularly hate it when, just as the person you're calling finishes asking you to leave a message, the computer comes on to say, "Please leave your message now." *That's exactly what I was about to do before you intruded, you %#*@! moron.* "When you are finished leaving your message," the computer continues, just as if you hadn't spoken, "press 5 for more options." *Oh, great! Just what I wanted—options.*

Voice mail systems throw in all that crap simply to justify their high price tags. After all, since all callers really want to do is leave messages, there's no reason not to simply buy a bunch of inexpensive answering machines. It's fear of that obvious, logical alternative that makes the voice-mail vendors promote a bunch of unwanted "features."

In any case, whether it's called voice mail or something else, computerized call routing is basically a form of automated passive aggression, designed to discourage every telephone call that isn't an order (you notice how rare these systems are in the *sales* departments). Some MBA who's never produced anything anyone wants to buy (and who doesn't have a clue about how to do that) looked at how much time and money the company was wasting actually talking to its customers and decided that that was the perfect place to cut costs.

You'd think even MBAs would know better, with the example of WordPerfect staring them right in the face. I've never used it myself, but I'm told that WordPerfect for the PC is relatively clumsy, counterintuitive and hard to learn. How, then, did they make it the best-selling word processor in the world? By always putting customer support first. By hiring hundreds of employees whose only job it is to answer the phone. By caring about the people who use their product.

Now consider Aldus. This is the company that literally invented the term *desktop publishing*. Their pioneering program PageMaker dominated the field from the start. But Aldus coasted on PageMaker's early lead and didn't improve PageMaker as needed (see *we fear change* below); now Quark has passed them by—in quality, if not yet in sales.

So how does Aldus deal with this dire situation? By setting up a maze of recorded messages that offers, as one of its options, *nothing* but synthesized voices to respond to the keys you press. In other words, it's not just that you have to negotiate a labyrinth of computerized messages, each alive with ersatz cheerfulness and sham

warmth, in order to talk to a human being—no, if your problem is one of the common ones, the synthesized voices are *all* you get! (Actually, a lot of companies are now "offering" these automated help line systems.)

Quark's support line isn't any better. Instead of computerized call routing, you get put on hold forever. This is the old-fashioned, brutalist approach, but the subtext is the same: "Our lines are busy. They'll be busy forever. Isn't it obvious that we don't want to talk to you? If we *did* want to talk to you, we'd hire enough people to answer our phones. Can't you take a hint?"

Naturally, the people who use the infinite-hold approach don't come out and say that. No, they say just the opposite, interrupting your reverie of a romantic idyll with, say, Laura San Giacomo—which you've drifted into as a subconscious defense against catatonia, as you sit there with the phone pasted to your ear—with a synthesized voice that says things like "your call is very important to us." Yes, it's important to us—it's cutting into our profits. So hang up and stop bothering us.

(Ken Maki says that, in his experience, it doesn't make a lot of difference if you *do* get through to Quark—he's only talked to someone who could help him about 50% of the time. And he's also found the management of the company to be not very interested in helping customers solve legitimate problems.)

Another line that really annoys me is, "due to an unusual volume of calls...." There should be a law requiring any such message to also state what *percentage* of the time it plays. If it's more than 50%, the message should be required to say, "due to our *usual* volume of calls...."

When I was in high school, we called people we considered phonies *pseudos*. Yes, I realize that *pseudo* isn't a noun—or even a whole word—but we didn't know that then. We didn't know much, with the three pounds of grease on our crew cuts compressing our brains. Those were benighted

times. I like to say that I experienced one of the great ironies of world history—growing up in Chicago in the '50s being told how the *Russians* brain-washed people.

Anyway, a pseudo was someone who had any vision beyond our own rigidly constricted one. Pseudos said *DRAH-muh* instead of *DRAM-uh*, weren't Bears fans, had *feelings*. You know the type.

My views on who's a pseudo have evolved since then. Now I think of them as people who program computers to say things like, "your call is very important to us." Not only are they as phony as a televangelist asking for "seed money," they're also so dumb that they actually think *you're* so dumb that this recorded reassurance, played over and over again, will make you forget that you've been on hold since the Norman invasion.

Why am I ranting on about the fatuousness of companies that can't even answer their own phones (aside from how much fun it is)? To lead up to a simple point: if the gods themselves struggle in vain against stupidity, why should you waste your time doing it? Before you buy a product, call the company's support line and see how long it takes to talk to an actual, knowledgeable human being. If it's longer than you like, choose another product.

We fear change

Remember in *Wayne's World* when Benjamin suggests a change in the show and Garth says, "We fear change" and starts pounding on a mechanical hand with that deranged look on his face? Well, there are companies who should adopt that as their motto. Can't you just see their title card on PBS?

> **TechnoDynoTronics**
> The Sexy Buzzword Corporation
> *We fear change.*

One of the ways this shows up most often is when a company has a winning product and is so astounded by the fact (and/or so shortsightedly greedy) that they stop developing and improving it. The problem with this *if it ain't broke, don't fix it* philosophy is that if everybody followed it, we'd all still be driving Model Ts and listening to Rudy Vallee. As technology progresses, standards (and users' expectations) rise. Things don't have to break to be superceded.

So no matter how much you like a program, and how comfortable you are with it, keep an eye on the competition. There may come a time when you'd be foolish *not* to switch over.

Ease of use—insist on it

A lot of software—with its impenetrable manuals, commands reminiscent of Shriners' initiation rites and what Michael Ward calls "unpleasant surprises"—isn't worth the trouble it takes to learn it. One of the major reasons people buy the Mac is to avoid all that intimidating, user-hostile gobbledygook.

Fortunately, most companies that publish Mac software seem to realize that. But not all. Some let their programmers' bizarre thinking mold the final product and others let dollar-crazed marketing executives make the decisions.

You shouldn't have to put up with any of that, so *don't*—not even for a second. The Mac is an inherently easy-to-use machine. If you find yourself having a lot of trouble learning to use a program, stop wasting your time and find another program that doesn't give you the same trouble.

Look for a logical hierarchy of commands

For software to be easy to use, it should be hierarchically organized. This means that most basic operations are simple and central to how the program works and the more advanced operations are off to the side, so you don't even know about them until you need them.

Mac software should be Maclike

Aside from being easy-to-use, the Mac's interface has another major virtue: you don't have to learn a new set of commands and procedures for each program. At least you *shouldn't* have to.

Some Mac programs, however, use nonstandard commands, or cripple the standard commands so they don't do what you expect them to. Whether you like one of these programs or not depends on whether you find the features it offers spiffy enough to justify switching gears between it and other Mac programs (and hitting a lot of wrong keys in the process).

You won't get consistency, so settle for customizability

Although the commands in Mac software are much more standardized between programs than those on the PC, they're still nowhere near as standardized as they should be. One thing that really irks me is the lack of consistency around the commands for boldface, italics and plain text.

On most programs (including the ones I learned on), you get italics with ⌘I and boldface with ⌘B. But in PageMaker, you have to hit ⌘Shift I and ⌘Shift B (this was true for a long time in Word too). Even worse is the command for plain text (that is, stripping out italics, boldface and all other type styles). In the original MacWrite, it was ⌘P; in MacWrite II and Nisus, it's ⌘T; in Word, it's ⌘Shift Z; and in PageMaker, it's ⌘Shift Spacebar.

Does this lead to frustrating typing mistakes? Is the Pope Catholic? Do presidents lie?

You can use QuicKeys or Tempo to customize most programs, but some are structured so you can't change all their commands. For example, in PageMaker, you can't change the command for plain text, because there's another command with the same name *(Normal)* on an earlier menu.

Since there are lots of people who are now very used to lots of different commands, true Macintosh consistency is a lost cause. What you can get instead (and which is almost as good) is the ability to change a program's commands to what you want them to be.

If you can, deal with the best

The best program isn't always the most expensive, although it usually isn't the cheapest (if it is, jump on it). And, of course, it often isn't easy to know which program is the best. But if you have a pretty good idea, don't tell yourself, "Well, I really can't afford that," or "I can get by with less."

This is almost always a false economy, as we all know from our experience of buying junky products that soon fall apart. You end up not only having to pay to replace the defective product (or program), but you also lose the time you've invested installing (or learning to use) the first one. So bite the bullet and get the best to start with—if you can figure out which it is.

No program is an Iland, intire of it selfe

When you buy a program, you don't know if you're going to want to always use it for everything. Even if you do, you're going to need to convert files created in other programs.

So the most elementary logic tells you that if you hope to succeed selling a Mac program, it needs to *import* documents from other Mac programs and *export* documents to them. And this is particularly true if you're hoping to break into a market dominated by a competing product.

If there was ever a category of software dominated by one product, it was (and is) Mac spreadsheets. Excel had 85–90% of the market when a slick new spreadsheet called Wingz tried to challenge it. Wingz' publisher lavished (what looked like) millions of dollars promoting the product before it came out, with a trade-show booth that looked like a space ship had landed, free jackets with their name on it, etc. etc.

I couldn't wait to see what Wingz' powerful graphics capabilities could do for my tired old Excel spreadsheets. So as soon as I got Wingz, I tore open the package, flipped the manual open to the index and looked up *import* (or *importing*, or *importing data*). No entry. So I looked up *data, importing*. No entry. So I looked up *Excel*. No entry. So I looked up *foreign files*. No entry. So I looked up to the sky, shook my head, thought about how many Excel spreadsheets I used in an ongoing way and am not about to redo, and tossed Wingz back into the box.

By the way, it wasn't just the index. Wingz had no way to directly import Excel files (although you could, of course, do it if you jumped through hoops). As a result of this (and no doubt other bad planning), Wingz is no longer a Mac product.

This would be pathetic if it were the story of one publisher. But it's the story of dozens. They act as if their product is the only one around, the only one their potential customers have ever—or will ever—come in contact with. They treat connecting with other software almost as if it were treason or something. It's sort of like xenophobia, but what I really think it is, is stupidophilia.

Speed counts

As many people have learned to their sorrow, ease of use isn't everything. How fast a program runs can be even more important. Unfortunately, that's seldom mentioned in ads or by salesclerks and it's one of the hardest things to evaluate in an in-store tryout.

But delays of even a few seconds can be very annoying if you keep running into them. Because of that, speed is one of the prime things to look for in a program. Many computer novices tend to ignore this consideration—since doing something on a computer is always so much faster than doing it by hand. But, believe me now or believe me later, if you buy a slow program, you'll live to

regret it. (Steve Michel says no one *ever* realizes this; they just go for the power.)

You want a great manual you don't need

No matter how great a program is, it doesn't do you any good unless you know how to use it. Mac software should be so clear, its menu commands so understandable, that you don't even need a manual. If you *do* need a manual, at least it should be a good one.

Ironically (but predictably), the easiest programs to learn tend to have the best manuals and the hardest programs to learn tend to have the worst manuals.

A manual should have an index, not an imitation of one

I don't know about you, but I'd rather have all my teeth removed without anesthetic than follow the tutorial in most manuals. They're the equivalent of being strapped into a chair and forced to listen to scales for three months, then *Three Blind Mice*, then *Twinkle, Twinkle, Little Star*, then Lawrence Welk—all under the guise of teaching you music appreciation.

(I once saw a sign in an old New York elevator that read: *To actuate elevator mechanism, press button corresponding to floor desired.* Now try to imagine someone who could read and understand that message but who didn't know how to press a button in an elevator. Most tutorials take the same approach.)

All I want from a manual is a good index, so I can look up what I need to and get out of there. Unfortunately, the only purpose most indexes serve is to allow the company whose manual it is to say, "Look! Look! An index!" And it's true—they do *look* like indexes. Why should I spoil the illusion by pointing out that you can never *find* anything in them?

As far as I'm concerned, if the index is worthless, so is the manual. And if the manual is useless, so—usually—

is the program (the exception being those programs that are so intuitive, so easy to use, that you don't need the manual at all).

Shareware is worth trying

To be absolutely sure you're going to want a program before you buy it, you need to use it for some reasonable period of time. The best way to do that is *shareware*—software you're allowed to copy freely and only pay for if you like it and continue to use it. As you'll discover from reading this book, some of the best Mac programs are shareware.

In order to encourage this proconsumer approach to software distribution, always give shareware a try before spending money for a commercial program that does the same thing, and *always* pay for any shareware you end up keeping and using.

If you don't, the people who write it will have to find some other way to make a living and will no longer be able to update their programs or create new ones. In the short run, you'll save a little money; in the long run, you'll lose a lot, as you end up paying more for programs you're not even sure you'll use, because no good shareware alternatives are available.

Public-domain software

Lots of programs are available absolutely free, thanks to the generosity of their authors. You can get this software from good computer stores (if you've done business with them), user groups or bulletin boards. You often have to put up with skimpy documentation, or none at all, and early versions of most programs have bugs. But there's a lot of terrific public-domain software, some of it better than commercial programs.

(You can get a sampling of great Mac shareware and public-domain software on *The Macintosh Bible Software Disks*, which have a money-back guarantee. They're described at the end of Chapter 20.)

In-store tryouts

Any decent computer store will let you sit and play with software for hours at a time, as long as no one else wants to use the machine (unfortunately, someone almost always will). Trying a program in a store will often (but not always) give you enough of a feeling for it to decide if you want to buy it.

Money-back guarantees

If you're buying a program mail-order and sight unseen, try to get a money-back guarantee. Remember—a lot of software isn't worth using, no matter how good it sounds.

Support, support and support

There's a saying in real estate that the three most important things to consider when buying property are *location, location and location.* Likewise, the three most important things to consider when buying a computer product are *support, support and support.* (Support is the availability of someone to answer your questions, usually on the phone, and to fix things if they go wrong.)

Support is the reason it often makes sense to pay a little more to buy from a vendor whose staff knows something (whether it's a local store or a mail-order distributor). Don't imagine you can depend on the publisher's telephone support line. As mentioned above, most of them are so understaffed that you might as well just play a tape recording of a busy signal and not tie up your phone.

Fortunately, there are some exceptions. Microsoft, once one of the worst offenders, has gotten impressively good lately—I've had short (or no!) waits and reached knowledgeable techies. Claris also has generally good support, and so do most small companies.

Don't use a bazooka to kill a fly

You should use a computer to do things you can't do more easily in some other way (with pencil and paper, for

example). The Mac can't make you organized or creative (although it can certainly help you organize and create).

Along these lines, check out the integrated programs in Chapter 18. For many people, who don't really need a full-powered word processor and a full-powered spreadsheet and a full-powered database (and so on), they offer the best value.

Thou shalt not steal

In the case of some programs, there are more illegal copies in existence than legal ones. (Not that this is always bad for the publisher. WordStar became an industry-standard word processing program at least partly because so many people had bootleg copies of it.)

Most of the problem is that people give copies to their friends; few computer hackers are despicable enough to steal someone else's work and then *sell* it. Still, the average program represents many person-years of labor, and you can't blame a publisher for wanting to protect that investment.

As a result, most Mac software used to be *copy-protected.* (There are many ways to make it difficult to copy a disk and no way to make it impossible, so it becomes a question of percentages: "How many hackers can we outsmart?")

Copy-protection was a real drag and virtually all Mac software publishers have stopped doing it. This puts the burden on us. If people can't make money developing software because everyone is stealing their software instead of buying it, soon there won't be any good programs at all. (I know I'm repeating myself. This bears repeating.)

Beware of vaporware

So much software has been promised that never saw the light of day (or saw it on a day many months after it was supposed to) that there's even a name for it—*vaporware.*

So when some salesclerk (or ad, or friend) tells you that a new product will be along "real soon now," don't depend

on it. Few computer products come out on time, and a significant number end up being nothing more than vaporware.

Don't pay to be a beta tester

When software publishers get a product to a certain stage, they hand out copies to people on the outside and ask them to test it. This work, called *beta testing*, is almost always unpaid; the testers are motivated by the advantage (or prestige) of being the first to know about something.

That's all fine, but don't *pay* to beta-test a product that's already been released. Vaporware is bad enough, but it's much worse to spend your good money on a product that's full of bugs.

So wait a while when a new product comes out. Go to a user group meeting or two and see if anyone's having problems with it. If you telecommunicate, ask about it on a bulletin board. Remember: feeling impatient is a lot less painful than feeling victimized.

Trust good publishers

Since movie reviewers spend most of their time telling you the plot (and usually can't even do that with any accuracy), one of the best ways to decide if a movie is worth seeing is to find out who directed it. Similarly, one of the best ways to tell if a program is worth buying is to judge by the company that publishes it.

Take reviews (including ours) with a grain of salt

One problem with reviews is that most reviewers aren't like most users. They tend to have much more experience with Mac programs and to be much more interested in exploring the Mac as an activity in itself. (I call this tendency *expertosis;* it also causes a problem with manuals.)

Another problem is that reviewers are seldom given enough time to really get to know the ins and outs of the software they're evaluating. Lots of programs are complicated enough that you don't really get a feeling for their

strengths and weaknesses until you've used them fairly heavily for a couple of months.

A third problem is that magazines are supported by advertising revenues, and while I'm always surprised by how tough they're willing to be in spite of that fact, no magazine's reviews are going to be, on the average, 75% or even 50% negative.

Still, reviews are a great place to learn about products. Just don't treat them as the holy gospel—even when they appear in the Bible. (In fact, *especially* when they appear in the Bible. Magazines can afford to do a much more comprehensive and thorough job of evaluating whole classes of products. All we can do is give you the opinions of an expert or two, or—at best—what the general consensus is among the Mac experts we know.)

There's a scene in an episode of *The Big Valley* (one of those rare moments when we're not looking at Barbara Stanwyck and thinking, "Boy she looks good! How old is she anyway?"—which, as near as I can figure, is the main point of the show). Someone has just finished destroying some lame-brained idea of Heath's (he's the dumb one, remember). There's no argument Heath can make in response; his viewpoint is utterly without merit. So he snarls, "You've got all the answers, don't you?"

Well, we don't have all the answers, and neither does anyone else, and you shouldn't expect anyone to. It's obvious when stated that baldly, but in practice, it's regularly ignored. People are always asking me what products to buy. All too often, they don't want to learn about what's available, they don't want to think about their needs—they just want me to *tell* them what to buy. I ask them, "Would you buy a car that way?"

There's a Yiddish saying that sums up perfectly the approach you should take: *frayg an aytsa yaynem, un hob dayn saykhel bei dir*—ask for advice, then use your own head.

Hardware buying tips (AN)

This book is filled with specific evaluations and comparisons of Mac hardware. What follows here are some general guidelines on what to look for and avoid.

As with a car, the three most important things to look for in a piece of computer hardware are: whether it can do what you want it to do; how reliable it is; and (with a nod to Commandment IX above) how easy it is to get it fixed.

One way to maximize your chances of getting a reliable (and repairable) piece of hardware is to buy from a company with a commitment to quality. Granted, that commitment can evaporate like the morning dew—and has, many times—but you *still* stand a better chance from a company that's had it in the past than one that hasn't.

Don't get mad—get even

It's astounding how little some companies care about their customers. I could give you several examples of this, but it doesn't seem fair to single out just a few companies when there are so many bad ones.

If you do get screwed, don't waste a lot of time writing long letters. If people don't treat you decently, it's usually because they *aren't* decent, and your heart-wrenching appeals are going to fall on deaf ears and hearts of stone.

Make a few, good-faith efforts to get them to do what they're supposed to, then go *directly* to Small Claims Court. *(DO NOT PASS GO. DO COLLECT $200+.)* Marshals seizing their office equipment—that's the kind of thing these companies understand. (For how to do it, see *Everybody's Guide to Small Claims Court* from Nolo Press.)

Some good guys

On the bright side, there are a lot of excellent, caring, moral companies. For example, we've had great experiences at Goldstein & Blair with APS of Independence, Missouri.

Because their prices are often the lowest around, we've bought several hard drives from them.

One drive we reshipped to an employee who worked in an outlying office. Although the drive worked at our office, it was broken when it got to her. She called APS and was immediately impressed with their competence on the phone. She was even more impressed with their service: in spite of the fact that we had reshipped the drive, they sent her a replacement drive *overnight, at no cost.* The morning after she called, she had the new drive.

APS didn't even ask her to return the old drive until she got the new one. (I should mention that the people she dealt with at APS had no idea who we were or that they could get some good publicity out of this. They thought we were just another customer.)

MacConnection keeps blowing people's socks off with the speed with which they ship orders. ComputerWare has a reputation for being very knowledgeable and great to deal with.

We know there are a lot of other great dealers and manufacturers out there. If you'll send us your experiences about them, good or bad, we'll try to incorporate them into the next edition. (Write Feedback Cache, G&B, Box 7635, Berkeley CA 94707, or *Mac.Bible* on AppleLink or *Mac Bible* on America Online.) In the meantime, here are some general hardware-buying guidelines.

What to look for

First, look for a good long warranty—at least a year. Lots of companies offer two-year, three-year or even five-year warranties. (Of course these companies may not be around in five years, or even two, and that's definitely something else to consider.)

Another important consideration is good support. You want to buy from a vendor who will answer any questions and deal with any problems that come up, and who will

make you feel like a colleague, not an annoying pest, while doing so.

Last—but not, needless to say, least—is price. How important it is depends on your budget, of course, but let me say this: Don't underestimate the Mac's importance in your life. This is not some trivial plaything—this is a very powerful tool for personal expression.

If you *want* something—a laser printer instead of a dot-matrix printer, say, or a big screen instead of a nine-inch one—you'll usually be happier if you figure out some way to justify having it. I've seldom if ever heard anyone say, "I really shouldn't have bought this *[expensive piece of computer equipment]*. I really could have gotten by with *[something simpler and less expensive]*." But I can't count the number of times I've heard people who've gotten some powerful new piece of hardware say, "How did I live without this?"

Don't do today what you can put off till tomorrow

On the other hand, don't buy something you plan to grow into; by the time you grow into it, you'll be able to buy something better for less. There's one exception to this rule: If you're about to buy your first hard disk, get twice as much capacity as you think you'll need. You'll fill it up before you know it.

It is possible to outsmart this rule, if you really jump in size. For example, when I went from 144 megs to 315 megs, it took me a long time to fill up the new disk. But there's also an exception to this exception to the exception. If you start dealing with lots of TIFF files (typically from scanners), especially color TIFFs, virtually no disk is going to be big enough.

One person I know who does that kind of work bought a *1.2-gigabyte* drive. He said he never wanted to get a *disk full* message again. But he already has, just a few months after he got the disk. I also know a service bureau that works with hundreds and hundreds of scans. They have

two 1.2-gigabyte drives and are always backing up onto cartridges and tape to make room on the disks.

Anyway—because computer technology is still on the steep upslope of its growth curve, technological advances that provide more power for less money have (so far) always greatly outstripped increasing material and labor costs. Sometimes prices go down a lot and sometimes they go down a little, but they almost always go down.

Don't put off till tomorrow what you can do today

Since prices are always falling, people will sometimes advise you to wait and buy later, when whatever you're buying will cost you less. This advice doesn't always make sense. For one thing, if you followed it faithfully, you'd never buy anything. For another, it fails to consider the value of owning and using the equipment, which, in my experience, has almost always outweighed whatever money I might have saved waiting for tomorrow's lower price.

So, if you have a use for something right now, and you *want* it, do without the new car—the Mac is more fun.

Why don't they all?

(SA/AN/ND/JK/SM/KF)

Some software publishers introduce such nice additions to the standard Mac interface that they make you wish that all programs had them. For example, Microsoft programs (and others) let you double-click on a window's title bar to make the window fill the screen (and/or to toggle it back to the original size)—and they did that long before Apple introduced the zoom box, which does the same thing.

(Microsoft's is by far the better approach, because the zoom box is often off the right edge of the screen when you're shuffling windows around—and, even when it's not, it's still always going to be harder to get to and click on than simply double-clicking anywhere on the title bar.)

Below are some other features that we believe should be standard on all Mac programs. Usually we mention the program(s) we first saw each feature in, but be aware that many other programs may also have the same or similar features.

If there are features you wish were part of the standard Mac interface, let us know about them. If we like them, we'll publish them in future editions, and mention your name if you're the first person to suggest the idea (as we have below).

- Data safety is probably weakest area of Mac software, and Nisus is one of very few Mac programs with multiple undos. If you've never used this feature, you may be thinking, "Multiple undos. My, isn't *that* exciting!" Well, multiple undos may not compete with multiple orgasms, but once you get used to being able to go back five or ten undos, you'll never want to live without it again.

- Nisus also lets you automatically save after any number of keystrokes you specify. That's better than automatically saving after a certain amount of time, which might be way too seldom if you're working like a demon, but way too often if you've walked away from the computer.

- Both Word and Nisus automatically make backup copies (with the tag *.bak* appended after the regular file name) so you always have the last *two* versions of your file on disk. (You can disable this feature if you don't want it.)
- If you've edited a document but haven't saved the changes, More II lets you know that by underlining the filename in the Window menu. (Nisus has a similar feature.)
- Many Mac programs make it easy to add, remove or change keystroke equivalents for menu commands.
- When you drag a tab to place it on Nisus' ruler, a line extends from the tab all the way down the page. This eliminates annoying guesswork about exactly where to put the tab.

- Nisus and Word let you change page margins by dragging them in the page preview display, so you can see the exact effect of your changes. As you move the margins, the measurements are indicated on the screen.

- When Word's I-beam pointer (I) enters text that's formatted as italic, it bends over to the right (so does the insertion point, if you click to lay one down there). This makes it much easier to see what you're doing, and banishes the annoyance of selecting the wrong character because you can't figure out which one the pointer is on.

  There's another benefit to this feature: Since there's no way to tell how a space is formatted just by looking at it, it's a common experience to place the insertion point in a space and have the text you begin typing come out in italics (so you have to go back, select it and change it to plain text). With Word's approach, however, you know immediately when you move the I-beam to a space whether it's formatted italic or not, because if it is, the I-beam will bend to the right (as will the insertion point when you place it).

- We haven't seen this anywhere, but word processors should have horizontal lock, so you don't find yourself always scrolling sideways because you accidentally click in the horizontal scroll bar. People with two-page displays hardly ever need to move sideways in a window, and many other people hardly ever want to either. It's an annoyance every time it happens. (One way to implement this would be with a command that lets you hide the horizontal scroll bar.)
- Gary Newman of Petaluma California would like to see much wider use of progress indicators, like the one that pops up when you save a file in System 7.
- Mark A. Ayen of Stamford Connecticut thinks there should be a *New Folder* button in every Save As... dialog box.
- Andreas Prilop of Hanover Germany wants an easy way to put nonbreaking spaces between characters, so phrases like Louis XIV won't break across lines. There's the option space (you get it by holding down Option as

you hit the Spacebar) but in many fonts it's also wider than a regular space. As mentioned in Chapter 9, this combining of two features is far from ideal. When you want a hard space, you normally don't want a wide space, and when you want a wide space, you normally don't want a hard space. Hopefully font designers will someday start providing hard spaces and wide spaces as separate characters.

- Mario S. De Pillis of Amherst Massachusetts would like all word processing programs to have Word 5's feature that lets you print only the selected text in a document.
- John D. Curd of Richland Missouri wants a command that would let him automatically save a new version of a file to *all* of the disks that contain the file.
- The Mirror monitor has three ADB ports in its base, so you can connect your keyboard and mouse to it and put your computer somewhere out of the way. (This isn't a software feature, of course, but we felt it deserved to be here.)

A guide for beginners

(AN/JK/ND/SA/SM/CR/ByB/KF)

The Mac is the most intuitive computer ever sold, but that's not saying much. There are still things about it that confuse beginning users, and Apple's Getting Started manuals, while better than most, tend to make you wade through a lot of stuff you already know—or that's obvious—to get to the useful information. This brief introduction should get you up and running a lot faster than they will.

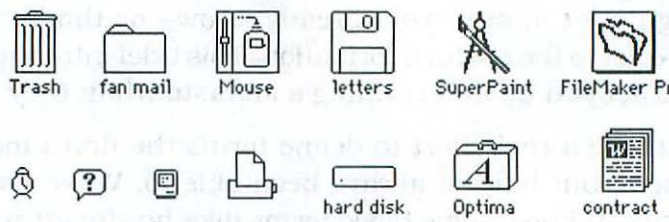
We make a real effort to define terms the first time we use them, but haven't always been able to. We've had to assume you know some basic terms (like *hardware*, in the next paragraph), because defining every single one would have slowed us down too much. This book has an *excellent* glossary and index. Use them whenever you come across a word you don't know (or aren't completely sure about).

It's a good idea to go through this beginner's guide sitting at your Mac, so you can try things out. (We assume you've already set up your hardware according to the instructions that came with it, and have turned it on.)

One more thing to be aware of: Apple is always updating and changing the Mac's basic *system software.* (System software is covered in Chapter 4; it includes the *Finder,* which is discussed below.) As of this writing, there are two versions in common use—System 6 (which Apple no longer distributes) and System 7. The illustrations in this guide show how the Mac's screen looks when running System 7. If you're using System 6 (or an earlier version), what appears on your screen will look slightly different from the illustrations you see below. Don't let that throw you—the basic principles are the same.

Icons and the pointer

The Mac's way of communicating with people is typically referred to as the *graphical user interface* (for you fans of 19th-century diction)—as if *all* computer screens weren't graphic displays. A better name (it's equally pompous, just to keep everyone happy) would be the *iconic user interface,* because it lets you control a computer by pointing at, moving and manipulating *icons* (little graphic symbols), which look like this:



As you can see, icons sometimes have names and sometimes don't. They can represent many things, including:

- *computer disks* (which store information; they're discussed in Chapter 3). Examples shown are the icons

named *hard disk* and the one that looks like a floppy disk and is named *letters*.

mostly for beginners

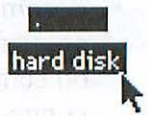
- *programs* (groups of instructions that tell the computer what to do). The icons named *SuperPaint* and *FileMaker Pro* are examples.
- *documents* (like paper documents, but created with a program on the computer and stored in its memory and on computer disks). An example is the icon named *contract* (you can tell from the icon itself that this document was created by a word processing program called Word, if you know what Word icons look like).
- *folders* (which hold documents, programs, etc.). An example is the icon named *fan mail*.

While we're doing basic definitions, we should introduce the term *file*, which simply means any collection of information on a computer disk or in a computer's memory that's grouped together and called by one name. Documents are files, as are programs (sometimes programs occupy several related files).

What you point at icons *with* is an icon itself; it's called, with simple elegance, the *pointer*. Actually, since the pointer can take many shapes, it's not one icon but a whole series of them. The most common pointer icon is a left-leaning arrow ( ). When you're dealing with text, the pointer takes the shape of an *I-beam* ( ). There are a whole slew of pointers for dealing with graphics, including , , , and .

In addition to pointing at icons, you also point at clear, simple, English words. This saves you from having to memorize a bunch of abbreviated commands, as you do on more primitive computers. (Since what you're doing in both cases is pointing, rather than typing commands, an even better name for how the Mac communicates with people would be the *pointing user interface*. But that sounds so...unimpressive. It would be like doctors calling *gastritis* a *stomach ache*. How much money could they charge if they did *that?)*

Only one part of any pointer—called the *hot spot*—actually points. On the arrow pointer, the hot spot is the tip. If just the tip of the arrow is inside something, then you're pointing at it (as in the illustration below); if all the arrow *except* the tip is inside, then you're not pointing at it.



You typically control the pointer with a *mouse*—a small box with a ball on the bottom and a button on the top (other devices, like *trackballs*, are also used). When you roll the mouse around, the pointer moves in the same direction on the screen (although normally a greater distance). You get so used to the mouse after a while, it begins to feel as if you're moving the pointer directly with your hand.

Here's a chance to clear up a very common problem beginners run into (we vividly remember the frustration ourselves): Often the mouse runs into something on the desk, or gets to the edge of the desk; if the pointer still isn't where you want it to be, what do you do?

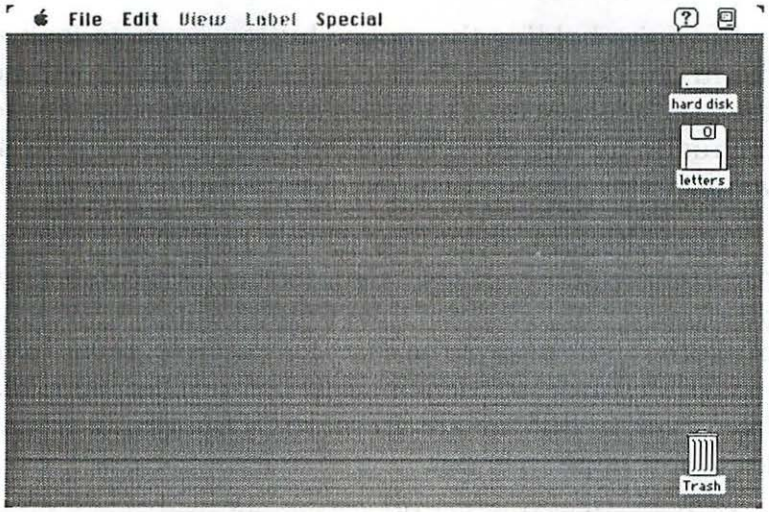
The solution is simplicity itself. The pointer only moves when the mouse is in contact with a surface, so all you need to do to move the pointer further is *pick the mouse up* and put it down where you have more room to roll it in the direction you want. Aha!

The desktop

A basic program that comes with the Mac (called the *Finder*) creates a gray area that covers the screen. Since most of what you do on a Mac would be done on the top of a desk if you didn't have a computer, this gray area is called the *desktop*. (Everything that follows describes how things look on the desktop, unless otherwise indicated.)

The first icons you point at are arranged on the Mac's desktop—disks, programs, documents, folders, etc. There's even a wastebasket called *Trash*—except, of course, in the real world, the trash can is *next* to the desktop, not on top of it. (The Trash is a special kind of folder you put things

into when you want to throw them away.) The illustration below shows you what a (very empty) desktop looks like.



The icon in the upper right corner represents the hard disk this Macintosh is running off of. (It wasn't called *hard disk* when it was purchased, but you can change the names of most things on the Mac and make them whatever you want.) The icon below, named *letters*, represents a floppy disk that has been inserted into the Macintosh (if you're following along on your Mac, insert a floppy disk now). The floppy can also be given any name you like.

(You can think of the hard disk as a massive filing cabinet perched on your desktop. Floppy disks, which are portable and hold much less information, are more like briefcases full of files that you carry around with you.)

Menus

The only thing on the desktop that isn't composed of icons is the line of words across the top left. This is called the *menu bar* and the words on it are called *menu titles* (isn't a word, of course, but most other menu titles are). If you put the pointer on a menu title and hold down the mouse button, a menu pops down over the desktop. Just as a menu

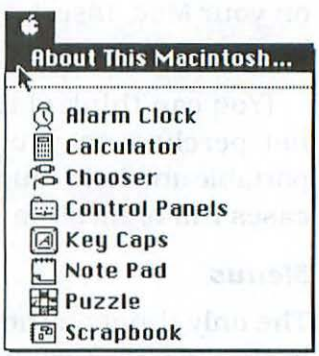
at a restaurant is a list of things you can order, a menu on the Mac is a list of things you can order the computer to do. They're called *commands* or *menu items.*

(If you're holding the mouse button down to look at a menu, you may want to release it; your finger will need the rest while Arthur rants on about a matter of crucial linguistic importance. The fainthearted among you may want to skip the next couple of paragraphs altogether.)

Apple insists on calling these *pull-down menus*—presumably on the theory that, in real life, things pop *up* (like toast) but *pull* down (like window shades). Well, first of all, that isn't always the case; for example, those oxygen masks stewardesses demonstrate before a flight pop *down* from overhead if the air pressure in the cabin drops (at least you hope they do).

But even if nothing in the real world ever popped down, that's *still* what the Mac's menus do. You don't grab the menu title and *pull* the menu down over the desktop; you *touch* the menu title with the pointer, press the mouse button and the menu *pops* down over the desktop (or *drops* down, if you prefer). The pointer stays up at the menu title, not down at the bottom of the menu, which is where it would have to be if you were pulling it.

I could go on about this important point for days, but it's probably easiest simply to say *menus* instead of *pop-down menus* and to save the adjectives for describing other sorts of specialized menus (we'll be talking about some later). Anyway, here's what a menu looks like:



This is called the *Apple menu* (since so few people can pronounce). The first item on it always tells you about the software you're using. If you're in the Finder (that's where you'll be if you've just started up your Mac), choosing

mostly for beginners

this command tells you what version of the system software you're using, who wrote it, how much space it takes up in the Mac's memory, etc. (it also tells you what model your Mac is). When you're in another program than the Finder, you get similar information about that program.

To select a command on a menu, slide the pointer down the menu, keeping the mouse button pressed down. As you pass each command, it *highlights*—that is, instead of appearing as black letters on a white background, it appears as white letters on a black background. When the command you want is highlighted (as *About This Macintosh...* is on the menu on the last page), you just release the mouse button and the command executes.

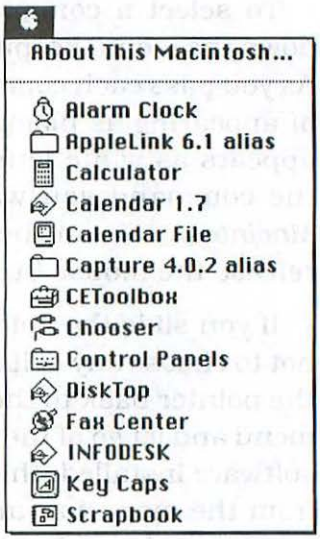
If you slide the pointer down a menu and then decide not to choose any of its commands, you don't have to slide the pointer back to the top; just slide it off the side of the menu and let go of the mouse button. (If you've got special software installed, this may cause the menu to "tear off" from the menu bar and remain on the screen; we'll tell you more about that later.)

Other than *About This Macintosh...*, all the items on the menu on the last page are programs that let you control what you see on the screen and how your Mac works, or handy little programs called *desk accessories* (also called *DA's)* that come with your Mac.

Desk accessories have a history. For the Mac's first several years, you could generally open only a single program at a time, but DA's were the exception—the menu was (almost) always available and you could run programs listed on it while you were working in other programs. For example, you could open the Calculator DA and add up some figures while you were in a word processing program.

However, in System 7 (and under *MultiFinder* in System 6), you *can* open more than one program at a time, and switch between them as you wish. Programs that have been designated DA's by their developers now differ only very

slightly from other programs. They're designed to be installed on the menu, but you can put them anywhere. And you can add the name of practically all other programs, documents and folders to the menu yourself, to make them more easily accessible. (See the entry called *adding items to the menu* in Chapter 4 for more details.)



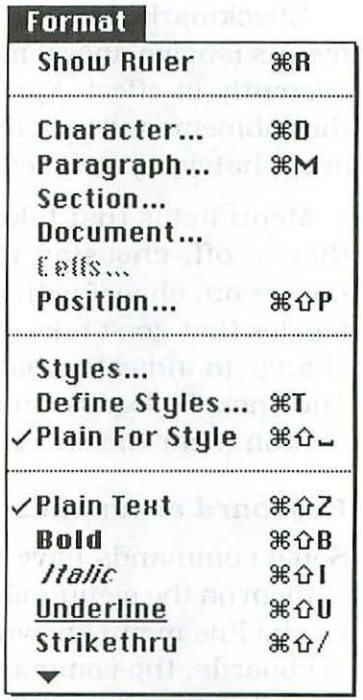
You can also remove any of the standard DA's from the menu (or anything else that's been put on it). A customized menu might look like this:

Shown below is the next menu on the menu bar—the File menu. As you can see, some of the commands are *dimmed* (or *grayed).* This means you can't use them at the present time—if you slide the pointer past them, they won't highlight. For example, *Print* is dimmed because we haven't yet picked a document to print.

Once you enter a program, you'll notice that some of its menus, and many of the commands on the menus, are different from the Finder's. For example, just about every program has a File menu, but you'll only find *New Folder* on the Finder's File menu and you'll only find *Save As...* on a program's File menu.

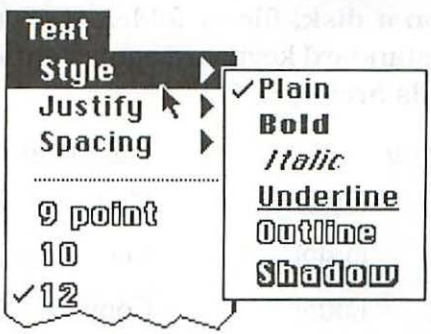
Sometimes a menu has so many commands on it that they run off the bottom of the screen.

In that case, a downward-pointing triangle appears at the bottom of the part of the menu you can see (as on the menu shown here). Sliding the pointer past this triangle makes the additional menu items *scroll* up (roll past you as if on a scroll, like the end credits of a movie).



When the command you want scrolls into view, you just slide the pointer to it to select it (actually, menu scrolling tends to really zip along, so you'll probably wind up sliding the pointer back *up* the menu to catch the item you want).

Some items on menus are followed by a right-pointing triangle (as on the menu shown below). If you highlight one of these, a *submenu* pops out to the right of the triangle (unless there's no more room on the right, in which case it pops out on the left). Without letting go of the mouse button, you then slide the pointer onto and down the submenu to select the command you want. (Or you can just drag directly to the command, as long as you angle toward the submenu and don't simply move vertically down the main menu.)



Checkmarks like the ones next to *12* and *Plain* on the menus (shown above) mean that the checked choices are currently in effect. For example, if you select *Bold* from the submenu and then reopen the menu, it will be checked, and whatever you typed next will appear in bold.

Menu items that take checkmarks are *toggles*—when they're off, choosing them turns them on, and when they're on, choosing them turns them off. There are also toggles that don't take checkmarks; instead, their names change to indicate what happens when they're selected. The *Show balloons* command described in *The Help menu* section (near the end of this chapter) is an example.

Keyboard commands

Some commands have *keyboard equivalents* listed next to them on the menu—like ⌘**O** next to the *Open...* command on the File menu shown on page 64. (On Apple's current keyboards, the command key contains an apple symbol as well as the cloverleaf symbol: ⌘, while older keyboards show just the cloverleaf. The command key performs the same functions in either case.)

⌘**O** next to the *Open...* command means that instead of moving the pointer up to the File menu, pressing the mouse button to make the menu pop down, going down the menu to the *Open...* command and then releasing the mouse button, you can simply hold down the ⌘ key and hit the O key and get the same result. (In the Finder, you can also hit ⌘N to open a new folder, ⌘I to get information on a disk, file or folder, ⌘F to find something, etc.) The standard keyboard equivalents for the Mac's basic commands are:

File menu		*Edit menu*	
New	⌘N	Undo	⌘Z
Open	⌘O	Cut	⌘X
Save	⌘S	Copy	⌘C

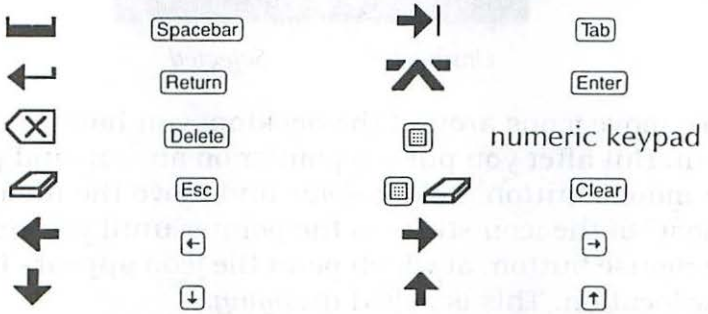
File menu		*Edit menu*	
Print	⌘P	Paste	⌘V
Quit	⌘Q	Select All	⌘A

As you can see, keyboard commands are often simply the ⌘ key plus the first letter of the command name. These ten keyboard commands are pretty universal, though a few programs use some of them for different things. The only ones that are really sacred are ⌘Z, ⌘X, ⌘C and ⌘V.

Sometimes other *modifier keys* are used with ⌘ to extend the power of the keyboard, like Shift, Option and sometimes Control. When they're listed in menus, the following symbols are used:

⇧ (Shift) ⌥ (Option) ^ (Control)

You'll sometimes find other symbols in menus. Here's a guide to some of them, with the symbol that appears in the menu on the left and the key it represents on the right:



The ⌧ symbol is needed to indicate the numeric keypad—sometimes ⌘1 and ⌘⌧1 (say) do different things. Since there's no symbol for the Clear key, which is on the keypad, it's referred to as—in effect—*keypad Esc*.

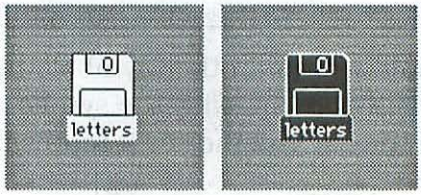
Selecting, clicking and dragging

Selecting is the single most important concept for understanding how Mac software works. The basic two principles are:

1. You always have to select something before you can do anything with it. (Apple calls this the "noun, then verb" or "hey, you—do this" approach. Another way to remember it is "select, then affect.")
2. *Selecting, in and of itself, never alters anything.*

Trying to do something when nothing is selected, or with something different from what you think is selected, is the cause of 90% of the confusion people have when learning to use the Mac.

To select an icon, you *click* on it—that is, you put the pointer over it, then press and release the mouse button. The icon reverses—what was white becomes black and what was black becomes white (or, on a color monitor, the colors reverse)—to show it's selected:

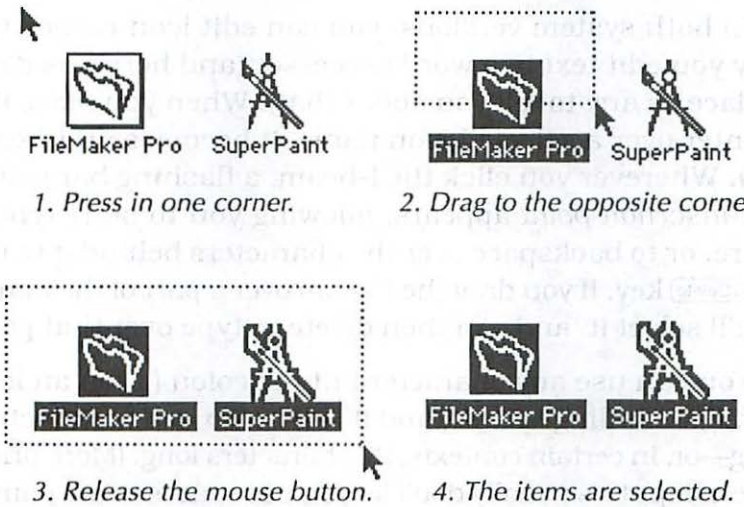


Unselected *Selected*

To move icons around the desktop, you have to select them. But after you put the pointer on an icon and press the mouse button, *hold it down* and move the mouse. A "ghost" of the icon sticks to the pointer until you release the mouse button, at which point the icon appears in the new location. This is called *dragging*.

When you click on an icon to select it, the previously selected icon automatically becomes deselected (turns from black to white). You can, however, select more than one icon at a time, by holding down the Shift key while clicking on them in turn. This is called *shift-clicking*.

Another way to select more than one icon at a time is to drag a *selection rectangle* around them. To do that, start by imagining a rectangle that would enclose all the icons. Then point to one corner of that imaginary rectangle, hold the mouse button down, drag the pointer to the diagonally opposite corner, and release the mouse button.



1. Press in one corner. *2. Drag to the opposite corner*

3. Release the mouse button. *4. The items are selected.*

An icon will be selected if any part of the selection rectangle touches it. (In System 6, the selection rectangle has to touch the icon itself; just touching its name won't select it.)

Up above we said you can change the name of just about any icon. You do it by clicking directly on the name (not on the picture part of the icon). An outline surrounds the name, allowing you to type in a new one:

If you just start typing when an icon is selected but without an outline around the name, another icon will get selected, instead of the name of the first icon being changed. That's because typing the first letter of an icon's name is a shortcut for clicking on it. (System 6 doesn't have this shortcut, so there's no distinction between selecting an icon and selecting its name. You can just click on an icon and start typing to change its name—you don't have to click on the name itself.)

In both system versions, you can edit icon names the way you edit text in a word processor (and here's as good a place as any to tell you about that). When you move the pointer over a selected icon name, it becomes an I-beam (I). Wherever you click the I-beam, a flashing bar called the *insertion point* appears, allowing you to start typing there, or to backspace over the characters behind it using the Delete key. If you drag the I-beam over a part of the name, you'll select it, and can then delete or type over that part.

You can use any character but the colon (:) in an icon name, including spaces, and it can be up to 31 characters long—or, in certain contexts, 27 characters long. (More primitive computers usually don't let you use spaces in the names of files, and require that the names be much shorter.)

Some Mac users favor techie names like *rec.rev4.exp.* Sure, it makes sense to use some abbreviations *(ltr* for *letter* is a good one), but why confuse yourself just so you can look high-tech? You've got 31 characters, punctuation, spaces—*use* them. Give your documents names like *Linda's 40th—it's all over now* and *BE/another psychotic break, eh?*, so you can immediately tell what they are, even years later. (There are times when you can only see the first 22 characters of a file name, so keep the essential

part of the name within that limit. This happens in *dialog boxes*, which are described below.)

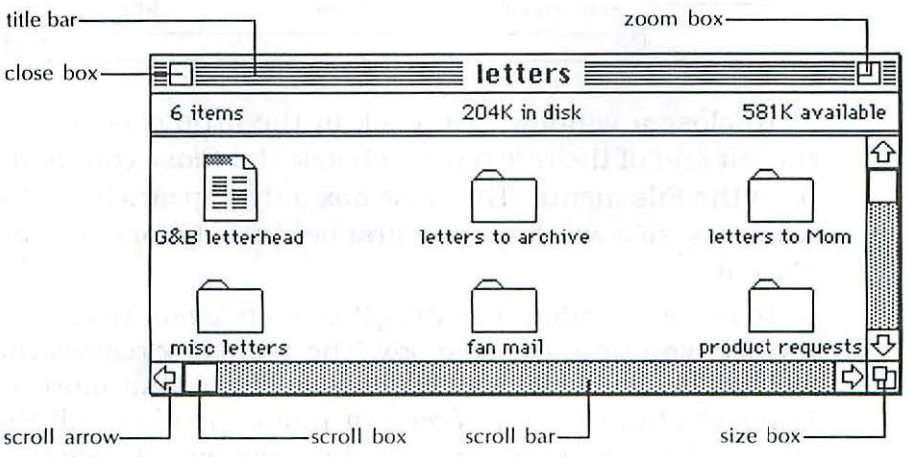
OK—now you're ready for another basic concept: *Icons can (and often do) contain things.*

Windows

To see what's in an icon, you *open* it—by pointing to it and clicking the mouse button twice in rapid succession. This is called *double-clicking.* (Be sure not to move the mouse between clicks or the Mac will interpret it as two separate clicks and not a double-click.)

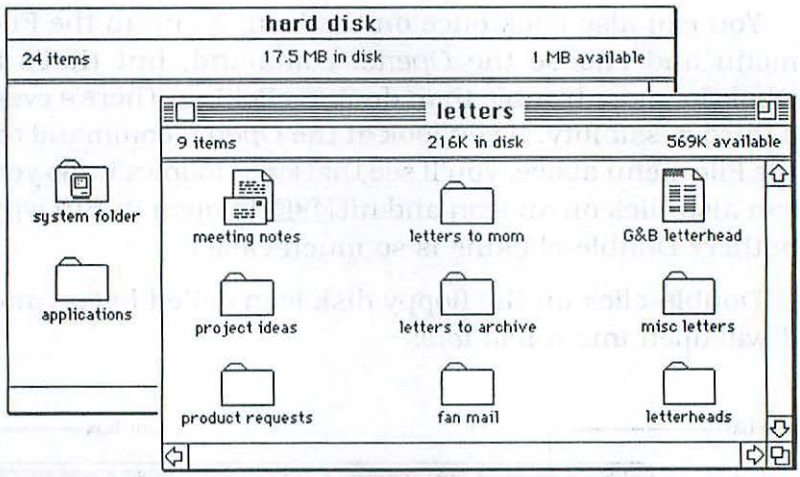
You can also click once on the icon, go up to the File menu and choose the *Open...* command, but that's a whole lot more trouble than double-clicking. There's even a third possibility. If you look at the *Open...* command on the File menu above, you'll see that ⌘O follows it. So you can also click on an icon and hit ⌘O to open it. But why bother? Double-clicking is so much easier.

Double-click on the floppy disk icon called *letters* and it will open into a *window:*



This window shows the contents of the disk (since the icon we opened was for a disk). In order to do anything with—or to—a window, it has to be *active* (selected). When it is, you'll see six horizontal lines in the *title bar* (which runs across the top of the window with the title in the middle).

A window is always active when it first opens (this is only logical, since you have to select its icon to open it). To select a different window—that is, to make a different window active—click anywhere in the other window. When it overlaps other windows, the active window always appears on top of them, as shown in the illustration below:



To close a window, you click in the little *close box* at the left end of the title bar (or choose the *Close* command from the File menu). The close box only appears in active windows, so a window must first be active before you can close it.

To move a window, you drag it by its *title bar.* To change its size, you drag the *size box.* The *zoom box* resizes the window to show all its contents and nothing more (if that's too big for your screen, it just expands to fill the screen); the next time you click the zoom box, the window goes back to its original size.

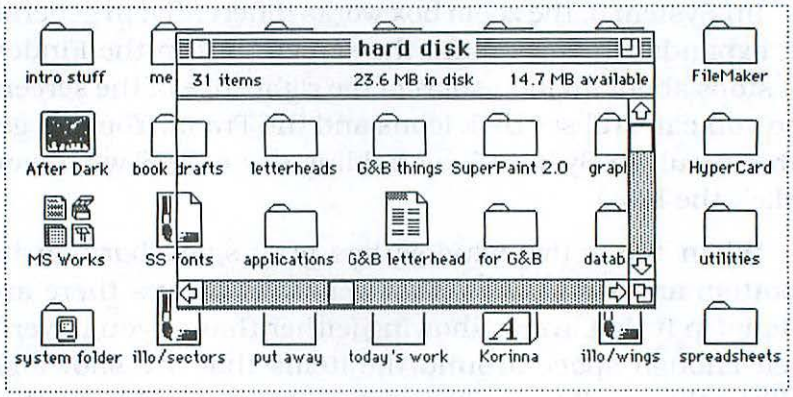
(In System 6, the zoom box works differently: in general, it expands windows to fill the screen, but in the Finder, it stops about an inch short of the right edge of the screen, so you can still see disk icons and the Trash. You can get this result in System 7 by holding down Option when you click the box.)

When the active window has gray *scroll bars* on its bottom and right sides, that generally means there are items in it that aren't showing (either that or you haven't left enough space around the items that are showing). When the scroll bars in an active window are blank, that means everything is already displayed in the window. Sometimes one scroll bar is gray and the other is white—it depends on where the missing information is located.

To bring missing information into view, you can use the *scroll box*, the *scroll arrows* or the gray area of the scroll bar itself. It's fairly tedious to explain in words exactly what each does (since they work in right-brained, Maclike ways), but if you experiment with them, it will quickly become obvious. (You may need to make your window smaller before you experiment so some of its contents are out of sight. To do that, point at the window's size box, hold the mouse button down and drag horizontally, vertically or diagonally.)

At first, the scroll controls may seem to work backwards. Click in an up arrow and things scroll down; click in a left arrow and things move to the right. Here's how to think of it: if you want to see what's towards the bottom of the window, you press the down arrow. If you want to see the items off to the right, you use the right arrow.

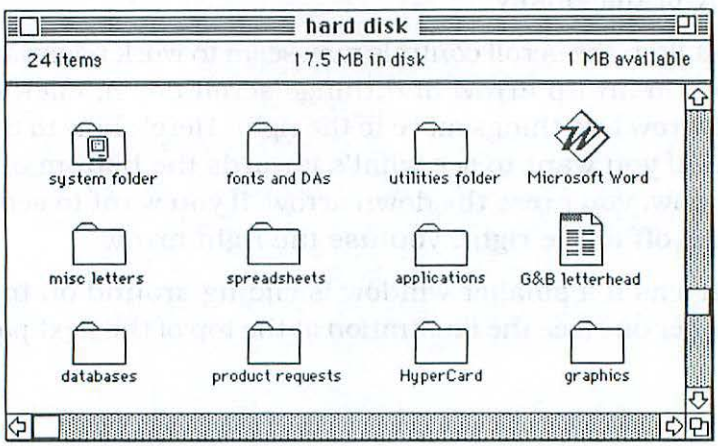
It's as if a smaller window is sliding around on top of a larger one (see the illustration at the top of the next page).



One final note on double-clicking to open windows: if an icon's window is already open before you double-click on the icon, all that will happen is that the window will become active (if it wasn't already). This is all that *should* happen, but sometimes beginners don't notice the change (expecting the dramatic zooming of a window opening) and think there's something wrong.

Programs, documents and folders

Now let's talk about what the icons in a window *mean*. To do that, let's go back to our old friend, the hard disk icon, and double-click on it. That produces this:



Most of the icons in this window look like folders, and that's what they are. You use folders to organize your icons. Double-click on any folder icon and it will open into a window that contains more icons. You can put folders within folders to your heart's content—whatever you need to organize your work and make it easy to find.

Microsoft Word is a program (in this case, a word processor, which you use to enter and edit text). Double-click on its icon and the Word program is *launched* (copied from the disk into memory, so it will *run;* for more on this, see the first entry of Chapter 3). There are various kinds of programs:

- *applications,* which are devoted to relatively large, complicated tasks like word processing, graphics work, page layout, etc.
- *utilities,* which perform support tasks, like searching for a specific file on a disk or counting all the words in a document, or relatively simple independent tasks, like Alarm Clock and Calculator on the menu
- *system software,* which controls the basic operations of the computer (like the Finder)

But there's a tendency among Mac users—and especially Mac techies—to call all programs *applications*, regardless of their type. Officially, even the Finder and the Alarm Clock are applications.

G&B letterhead is a document—in this case, a template for writing business letters that was created by the word processing application MacWrite. When you double-click on the G&B letterhead icon, it will first launch MacWrite (whether it's on the same disk or another disk attached to the Mac), then open itself so you can edit it, print it, etc. (More primitive machines won't automatically launch an application when you open a document created by it. You have to open the application first, then the document.)

Ways to view files

It's mostly only in the Finder—in folder windows and on the desktop—that files are represented by icons; in most other places, they're identified simply by their names. The View menu lets you display things by name instead of by icon in the Finder as well. This comes in handy when the windows on your desktop begin to clutter up with icons (which won't take long).

There's a *Clean Up* command on the Special menu that will tidy up your icons, but *list views* give you more information, and you can organize things in several different ways, to help you find what you're looking for quickly. As you can see, in addition to viewing *by Icon* and *by Small Icon* (which is the same as *by Icon* except that the icons are smaller), you can view:

- *by Name*—in alphabetical order
- *by Size*—from biggest to smallest, according to how much disk space they occupy
- *by Kind*—with all the documents of a particular sort (applications, folders, Quark documents, PageMaker documents, etc.) grouped together
- *by Label*—by categories you've attached with the Label menu (for details, see Chapter 4)
- *by Date*—in order of when you last changed them, with the most recent one first
- *by Version*—with all the documents created by a certain version of a program grouped together
- *by Comments*—in alphabetical order according to comments that are attached to them (you attach comments by selecting a file, choosing *Get Info* from the File menu and then typing notes in the box that appears); but under certain circumstances, the comments get erased
- *by Color*—according to the order of the colors in the Color menu (only available on color monitors, of course)

(Your View menu won't necessarily show all the above choices—the *by Label*, *by Version* and *by Comments* options appear only in System 7, the *by Color* option only in System 6. *By Version* and *by Comments* don't appear unless you've set them to.) Whatever view you've chosen is checked on the menu. Here's an example of a window whose contents are viewed by name:

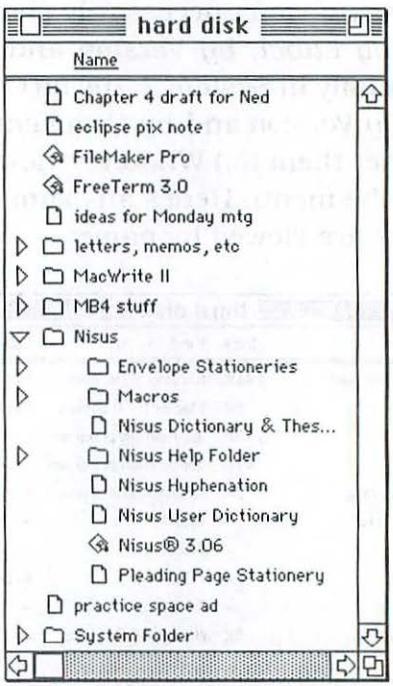
hard disk

Name	Size	Kind	Label	Last Modified
Chapter 4 draft for Ned	141K	Nisus® 3.06 docu...	Project 1	Tue, May 12
eclipse pix note	5K	MacWrite II docum...	Personal	Mon, Aug 19
FileMaker Pro	779K	application program	–	Mon, May 20
FreeTerm 3.0	47K	application program	–	Fri, Aug 2, 1
ideas for Monday mtg	5K	Nisus® 3.06 docu...	Project 1	Sun, Apr 12
letters, memos, etc	–	folder	–	Wed, May 20
MacWrite II	–	folder	–	Wed, May 20
MB4 stuff	–	folder	in progress	Wed, May 20
Nisus	–	folder	–	Wed, May 20
practice space ad	5K	Nisus® 3.06 docu...	on hold	Mon, Feb 24
System Folder	–	folder	–	Wed, May 20

Once you're in a list view, you don't have to use the View menu to find out which you're in; the column heading that's underlined shows how the items are sorted. You can even change the sort order simply by clicking on a different column heading (this only works in System 7, though).

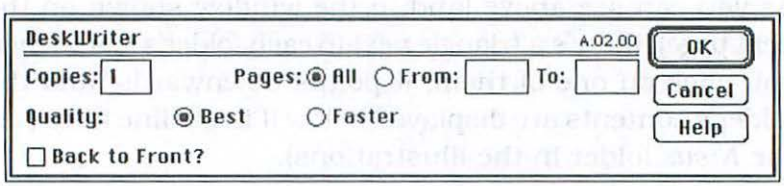
In System 7, list views also allow you to look at a folder's contents without opening its window, using *outline views*. As you can see above (and in the window shown on the next page), there's a triangle next to each folder's icon. When you click on one of them, it points downwards, and the folder's contents are displayed below it in outline form (see the *Nisus* folder in the illustrations).

If there are folders among those contents, you can see *their* contents—still within the same window—by clicking their triangles. Click on a triangle again and the outline view collapses back into its folder.



Dialog boxes and alerts

Choosing a command with an ellipsis after it *(Open...*, for example, or *Print...)* opens a *dialog box* (it's called that because the Mac is telling you something and asking for a response). Here's an example of a Print dialog box (exactly how they look varies with the application you're in, the printer you're using, etc.):



One way you respond to a dialog box is by typing in a *text box*, like the three rectangles to the right of the words *Copies*, *From* and *To* in the dialog box above. You can move from one text box to the next by hitting Tab. In

this case you're asked for numbers, but sometimes you're asked for words.

The other way to respond to a dialog box is by clicking on a *button*. There are three basic kinds:

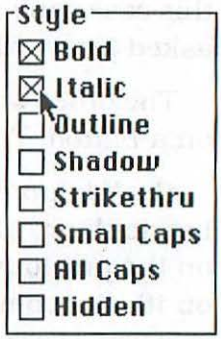
Push buttons are rounded rectangles with commands inside them, like the three on the right of the dialog box on the previous page. When you "push" the button (click on it), the command inside the button is executed, just as if you'd selected a command from a menu. When a push button is framed by a thicker rectangle, like the *OK* button above, that means it's the *default* button—you can click on it simply by hitting the Return or Enter key.

Radio buttons are little circles with names next to them (like the circles to the left of *Best* and *Faster*, and *All* and *From*, in the Deskwriter dialog box at the bottom of the last page). When you click on a radio button, it fills in (as with *Best* and *All*).

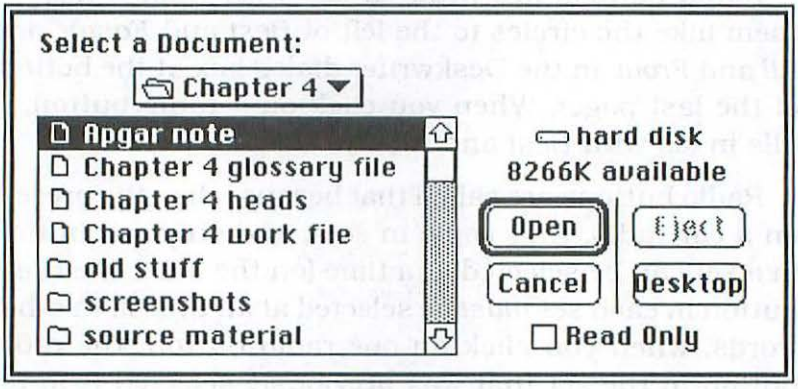
Radio buttons are called that because, like the presets on a car radio, they come in sets, and only one button in a set can be selected at a time (on the Mac, one radio button in each set *must* be selected at all times). In other words, when you click on one radio button, the radio button in the set that was previously selected is automatically deselected. So if you click on *Faster*, *Best* will automatically deselect, and if you click on *From*, *All* will automatically deselect.

Sometimes radio buttons activate text boxes. If you click on the *From* button (in the illustration above), you'll find yourself automatically in the text box to the right of it, with the program waiting for you to tell it what page you want to start from. It also works the other way around—if you click in that text box, the *All* button will automatically go blank and the *From* button will automatically fill in (since, if you're specifying a beginning page number, you obviously don't want to print all the pages).

Checkboxes are the third kind of button. They're little squares with names next to them (like the ones here). They're used for lists of options that *aren't* mutually exclusive. All the checkboxes in a set can be selected, or none (although sometimes at least one has to be selected). Clicking in a checkbox toggles it on and off (puts an *X* in it and blanks it again).



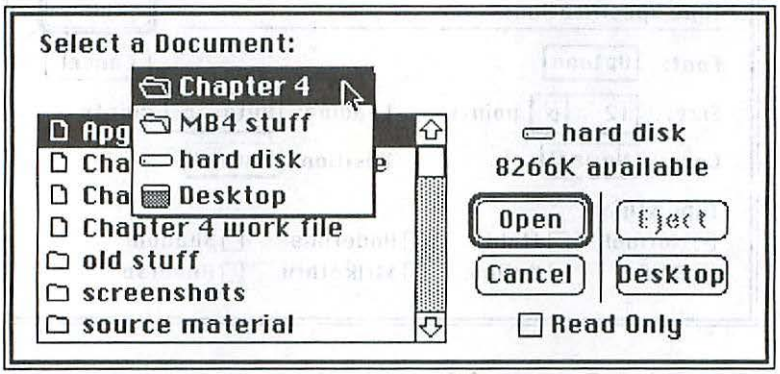
Another common feature of dialog boxes is the *list box*. For example, if you choose the *Open...* command from the File menu while in a word processing program, you'll get a dialog box that looks something like this:



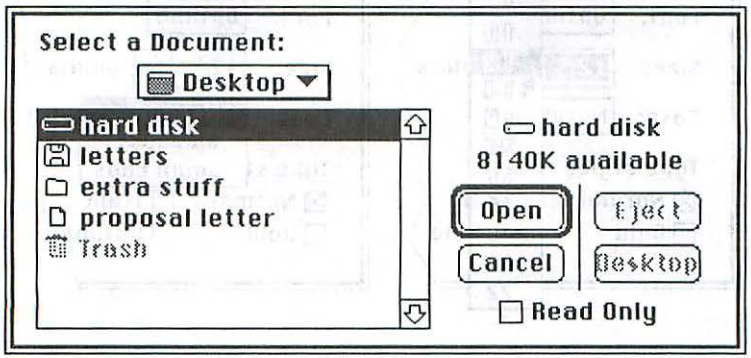
The *list box* is on the left; it displays the folders and documents that this program can open (it won't show documents that the program can't open). You can scroll through the list and open a document or folder by double-clicking on its name (or, if you're always looking for the hardest way to do something, by selecting it and then clicking the *Open* button on the right).

There are several ways to find the name you want in a list box—the two most basic are using the scroll bar and dragging down through the list itself. (For other ways, see the entry titled *shortcuts in Open and Save As dialog boxes* in Chapter 4.)

Above a list box is the name of these items' location (a folder, disk or the desktop itself). The name is in a rectangle with a drop shadow, which indicates that it's actually a menu. (Menus like this that pop up out of dialog boxes instead of down from the menu bar are called *pop-up menus.)* While the list box shows what the *Chapter 4* folder contains, the pop-up menu shows what contains *it*—it's inside the *MB4 stuff* folder, which is on the hard disk called *hard disk*, which is on the desktop.

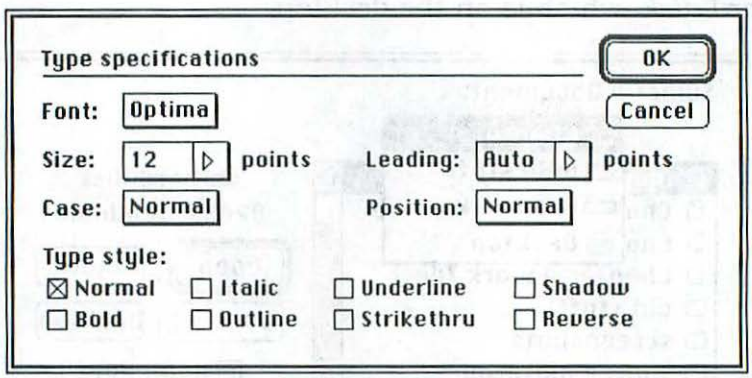


If you select *MB4 stuff* from the menu, the list below it will change to show all the folders and openable documents in that folder (the same happens if you select *hard disk).* If you select *Desktop,* you see a list of all the icons on the desktop that you can open—documents, folders, and disks your Mac has access to. (Clicking the *Desktop* button to the right of the list box does the same thing.)

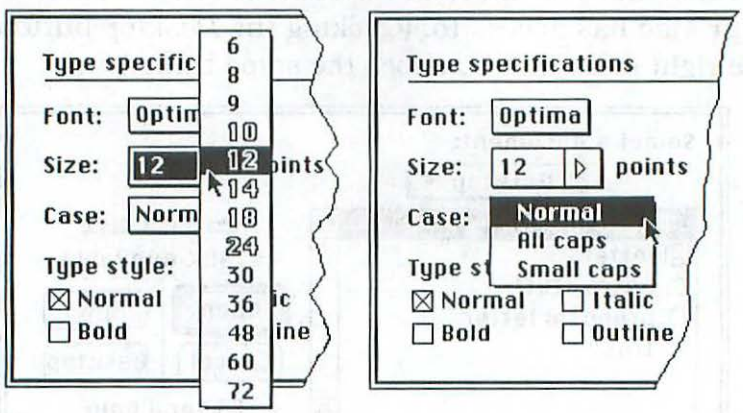


When you double-click on a different disk to select it from the list, its name appears next to the disk icon to the right of the list box. (In System 6, you can cycle through the available disks by clicking either on this icon or on a button labelled *Drive.)*

Here's a dialog box from PageMaker that contains eight checkboxes and five pop-up menus:



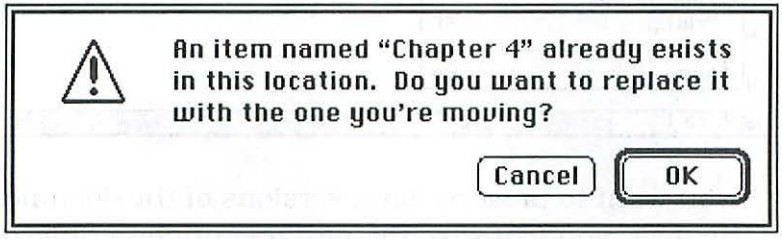
The *Font, Case* and *Position* pop-up menus work just like the one above the list box discussed in the last example (see the *Case:* pop-up menu in the illustration to the right below). To access the *Size* and *Leading* menus, you click on the hollow, right-facing triangles:



(The rectangles with triangles are really a combination of a pop-up menu and a text box, because you can either type text directly into the box or select it from the pop-up menu the arrow generates.)

If you make a lot of selections using a dialog box's menus, buttons, etc. and decide not to keep them, you can usually nullify all the changes you've made to all of them by clicking the *Cancel* button. Typing ⌘. will usually give you the same result.

An *alert box* (also called simply an *alert)* is similar to a dialog box, but without the dialog between you and the Mac. An alert either warns you or gives you some information, and often all you can do is acknowledge it by clicking on an *OK* button. Sometimes you can just do nothing and the alert will go away of its own accord, and sometimes there's a *Cancel* or *Stop* button that lets you stop whatever's going on, as in the alert box below:

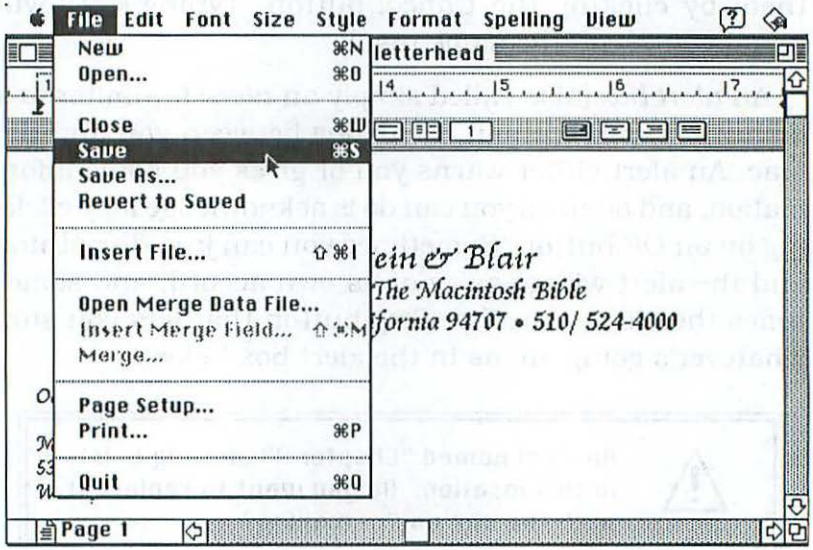


Saving, copying and throwing away

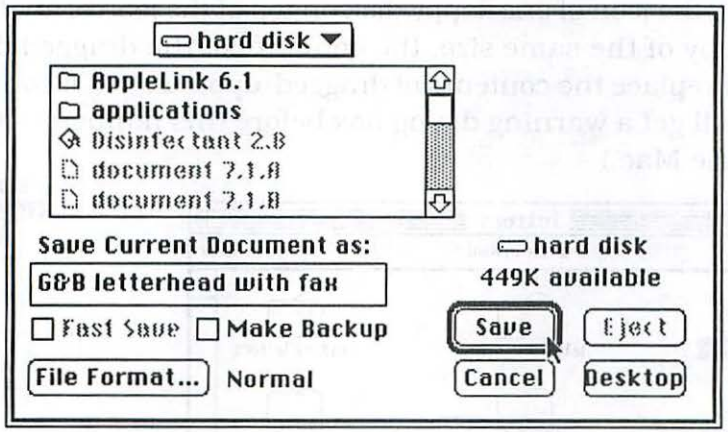
After you've worked on a document for a little while, it's a good idea to save the changes you've made. Saving a document means copying it from the computer's memory to a disk (or other storage medium) where it will be preserved even after the computer is turned off.

To save the document you're working on without changing its name, select *Save* from the File menu of the program you're working in. If you've previously saved this document, or opened an existing document from the

disk, the *Save* command substitutes the new version of the file for the original. For example, let's say a document called *G&B letterhead* needs a permanent change—a new area code. You don't want there to be a document lying around with the old area code on it, so after you make the change, you simply save the new document, thereby replacing the letterhead with the obsolete area code.



If you want to preserve both versions of the document on the disk, you can save the new one under a different name with the *Save As...* command. Let's say you want to create a new version of *G&B letterhead* that has fax information on it. You open the existing *G&B letterhead* document, add the words *fax to NAME at NUMBER / this page + 0 others*, choose *Save As...* from the File menu, type the new name—*G&B letterhead with fax*, let's call it—in the text box, and click on the *Save* button:



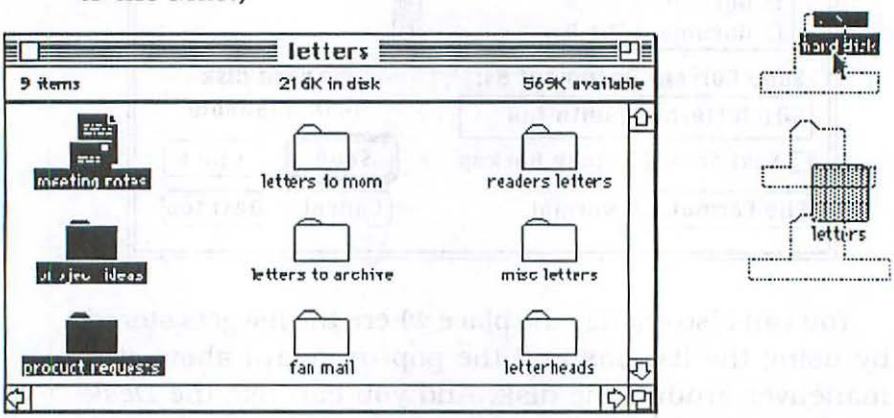
You can also change the place where the file gets stored, by using the list box and the pop-up menu above it to maneuver around the disk. And you can use the *Desktop* button to save the document onto a different disk. It's a good idea to keep backup copies of important files on more than one disk.

Apple's programmers had their reasons for using the desktop as a transfer point between disks, but it really isn't intuitive; in the real world, you don't have to put a report on your desk before you stow it in a different filing cabinet. Going to a different disk by way of the desktop is more like using the sidewalk when you leave your house to take a letter to the mailbox.

There's also a way to copy documents to other disks when you're out on the desktop, not in an application. It couldn't be easier—you just select whatever you want to copy (one or more documents, programs or folders) and drag it—or them—onto the other disk. The Finder automatically makes a copy—or copies—of what you're dragging and places it on the target disk.

You can also copy the entire contents of a floppy disk onto a hard disk, by simply dragging its icon onto the hard disk icon. The contents of the floppy will be placed on the hard disk in a folder that's given the floppy's name. If you

drag the icon of one floppy disk on top of the icon of another floppy of the same size, the contents of the dragged disk will replace the contents of dragged-upon disk. (Of course, you'll get a warning dialog box before this happens—this *is* the Mac.)

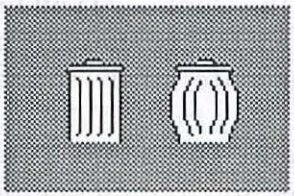


You can drag things around on the same disk, but when you do that, the *original* moves, not a copy. To tell the Mac to make a copy and move that instead (even though you're putting it somewhere else on the *same* disk), hold down the Option key as you drag. If you just want to make a copy of something on the same disk *without* moving it, select it and hit ⌘D.

You throw files out by dragging them to the Trash. Normally, things don't get thrown out immediately; they stay in the Trash in case you change your mind. If you do, just double-click on the Trash icon to open the Trash window and retrieve the file. (You can drag it out manually, or select it and choose *Put Away* from the File menu, which zips the item back to wherever it came from.)

To get rid of whatever's in the Trash, use the *Empty Trash* command in the Special menu. (In System 6, the Trash was also emptied automatically under certain conditions—for example, when you removed a floppy disk that contained a file you'd thrown away. But in System 7, the Trash only empties when you tell it to, or give your explicit consent in a dialog box.)

When there's something in the Trash, it bulges (as in the illustration below) to let you know it's not empty any more. When it gets emptied, it goes back to its normal, straight-sided shape.



Cut, Copy, Paste and the Clipboard

One of the most elegant and useful tools on the Mac is the *Clipboard*—a temporary holding place for material that you *cut* or *copy* from one place so you can *paste* it in another. It's temporary for two reasons:

- when you put something on the Clipboard, the Clipboard's current contents are replaced (that is, it can only hold one thing at a time)
- when you shut off the computer, the Clipboard's contents disappear

To *cut* something, you select it (how you do that varies with the program you're using), then pick the *Cut* command from the Edit menu—or just hit ⌘X. Whatever you've selected disappears from its original location and is stored in the Clipboard. (The Finder and many other programs let you check the contents of Clipboard by choosing *Show Clipboard* from the Edit menu.) *Copy* (⌘C) works the same way as *Cut*, except that the selected material stays in the original location in addition to moving to the Clipboard.

To *paste* what you've cut or copied, you just indicate where you want it and hit ⌘V—or select *Paste* from the Edit menu. (How you indicate the spot to paste depends on the application you're in.) You can cut and paste both

within and between most Mac programs. The amount of material you can transfer is virtually unlimited since, although the Clipboard is usually held in memory, it can also use disk space when it needs more room.

Remember that the Clipboard will hold only one selection at a time, so each time you cut or copy something new, the previous material disappears. On the other hand, since things stay in the Clipboard until you flush them, you can paste the same thing many different places—as long as you remember not to cut or copy anything else in the interim.

If you simply want to get rid of something, you can just cut it and never paste it; it will disappear the next time you cut or copy. Or you can just hit the Delete key instead, and whatever's selected will disappear without even passing through the Clipboard.

The Scrapbook

While the Clipboard is a temporary holding area for cut or copied material, the *Scrapbook* is a permanent file that you access with a command on the menu. What you put in the Scrapbook stays there not only when you add more stuff but also when you turn the machine off. (You can, of course, remove things from the Scrapbook whenever you want.)

Since you use *Cut*, *Copy* and *Paste* to get things into and out of the Scrapbook, they all pass through the Clipboard on the way. If you're just transferring a few things, it's easier to move them one at a time with the Clipboard—that is, to simply cut and paste them. If you have several things to transfer at one time, or if you want them to be available for pasting for more than one work session, the Scrapbook is more convenient. (For more on the Scrapbook, see Chapter 4.)

The System Folder

The *System Folder* is where the Mac looks for the basic software that tells it how to operate: the System file, the Finder, the Clipboard, the Scrapbook, etc. The System Folder is treated specially by the Mac; to remind you of that, its icon has a little picture of a Mac on it.

You can modify certain aspects of the System yourself, by adding or removing fonts, sounds and specialized programs called *extensions* (called *inits* in System 6) and *control panels* (called *cdevs* in System 6). See Chapters 4, 7 and 8 for more details on these.

Closing, quitting and switching between applications

When you're done working on a document, the File menu of the application you're using gives you two choices—*Close* or *Quit*. *Quitting* takes you out of the application and back to the Finder (that is, to the desktop). *Closing* leaves you in the application, so you can open another document.

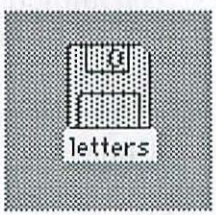
In System 6, Mac beginners often got lost when they closed a document (or the last document, if several were open) and were left with a blank screen with no icons on it. Arthur calls this the *nothing screen* (although nobody else does). If you're still using System 6, the thing to remember is that no desktop is completely blank—there's always the menu bar across the top. If you pop down various menus, you'll see that there are lots of things you can do. So here's the last basic principle—and it's a good one for people using System 7 too: *When in doubt, explore the menu bar.*

In System 7, there's another orientation aid—the Application menu. It appears at the right end of the menu bar and its title is an icon of the Mac (when you're in the Finder, that is; when you're in another program, the icon changes to represent that program). The Application menu lets you switch between programs, and hides clutter that belongs to programs you're not using at the moment. Here's how it looks when you have a few programs open:

To get back to the desktop from another program, chose *Finder* from the Application menu (or just click anywhere on the desktop).

Ejecting floppy disks

There are several ways to remove a floppy disk. The best way is from the Finder—just drag the floppy disk and icon to the Trash. (Don't worry—nothing will be erased from the disk; it's just a way of telling the Mac you want to eject it.) You can also use the *Eject Disk* command on the Special menu, but disks ejected that way leave behind a ghost on the desktop, which looks like this:



The Mac keeps a record of the ejected floppy and may later ask you to reinsert it. (If it does, and you don't have the disk around, hit ⌘.—several times, if necessary—and the Mac should leave you alone. Then drag the ghost to the Trash.)

You can eject floppies while you're working in an application too. Choose *Save As...* or *Open...* from the File menu, click *Desktop* in the dialog box that appears, select the floppy disk's name from the list and then click *Eject.* This works fine as long as nothing is open on the disk you eject. But if you've made changes to a file, folder or window that weren't saved to the disk, the Mac will demand that you reinsert that floppy at some later point, and will accept no substitutes. The Mac also ejects floppy disks when you shut it down.

Shutting Down

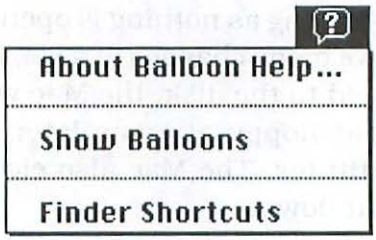
When you're done working and want to turn off the Mac, the first thing to do is to get back to the Finder. Then choose *Shut Down* from the Special menu. Depending on what Mac you have, it'll either turn itself off, or tell you it's OK to turn it off.

It's very important to shut down properly, and not simply turn the computer off. Shutting down gives the Mac time to do a little housekeeping and make sure everything you think is stored on the disk really is stored there. But it's OK to chose *Shut Down* even if you have files open—the Mac will ask you if you want to save your changes before it shuts down.

The Help menu

Anytime you can't figure out what's going on, you can turn to the Help menu (only in System 7). It appears next to the Applications menu on the right side of the menu bar; its title is an icon of a balloon with a question mark in it. Choose *Show Balloons* on the Help menu and, as you slide the pointer over items on the screen, balloons will

pop up that briefly explain how whatever the pointer is on works. To get rid of the balloons, select *Hide Balloons* from the menu.



The last command on the Help menu is *Finder Shortcuts*. It presents you with 27 suggested shortcuts for working in the Finder. Try them out once you feel at home with the Mac. (To get rid of the shortcuts window, click on its close box.)

Summary

Here's a recap of the most important principles to keep in mind when using the Mac:

- You have to select something before you can do something.
- By itself, selecting never alters anything.
- To open icons, double-click on them.
- When in doubt, explore the menu bar.

To learn more about using the Mac's basic software, read Chapter 4. To learn more about the theory and principles *behind* the Mac's basic software, a good book is *Human Interface Guidelines: The Apple Desktop Interface*, written by people at Apple and published by Addison-Wesley ($15). Although it's primarily aimed at programmers, it's quite accessible and pretty interesting.

Chapter 2

Basic Mac hardware

Models of the Mac *95*

Buying a Mac *121*

Upgrading your Mac *130*

Mac hardware tips *133*

Monitors *144*

Keyboards *170*

Mice and mouse substitutes *176*

Protecting your Mac *184*

Protecting yourself *192*

Models of the Mac

the Macintosh family

(AN/DH/SA/SM/ND/JK/RS/Mac Kenny/Hal Lewis)

There are currently three basic types of Macintosh computer:

mostly for beginners

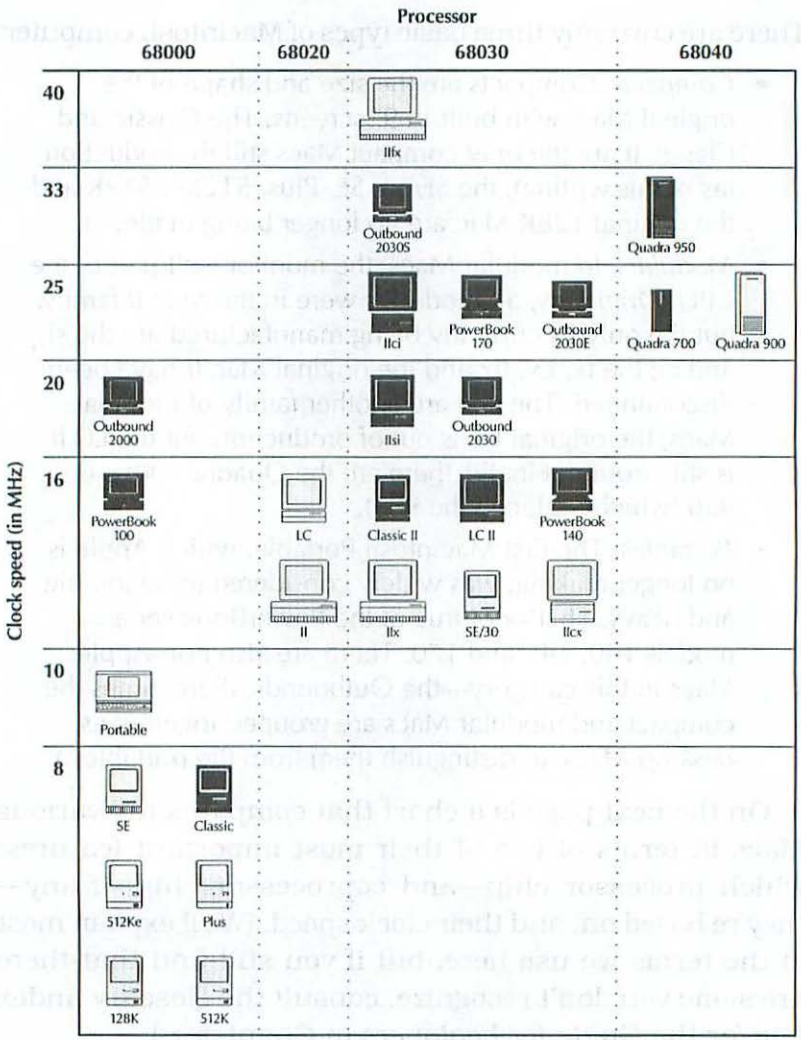
- *Compacts.* Compacts are the size and shape of the original Mac, with built-in 9" screens. The Classic and Classic II are the only compact Macs still in production (as of this writing); the SE/30, SE, Plus, 512Ke, 512K and the original 128K Mac are no longer being made.
- *Modulars.* In modular Macs, the monitor isn't part of the CPU. Originally, all modulars were in the Mac II family, but the only IIs currently being manufactured are the si and ci; the fx, cx, IIx and the original Mac II have been discontinued. The LCs are another family of modular Macs; the original LC is out of production but the LC II is still around. Finally, there are the Quadra 700 and 950 (which replaced the 900).
- *Portables.* The first Macintosh Portable, which Apple is no longer making, was widely considered to be too big and heavy. That's not true of the PowerBook series—models 100, 145 and 170. There are also non-Apple Macs in this category—the Outbounds. (Sometimes the compact and modular Macs are grouped together as *desktop Macs,* to distinguish them from the portables.)

On the next page is a chart that compares the various Macs in terms of two of their most important features: which processor chip—and coprocessor chip, if any—they're based on, and their clock speed. (We'll explain most of the terms we use here, but if you still find that there are some you don't recognize, consult the glossary, index and/or the *Guide for beginners* in Chapter 1.)

things to come

This chart—and the chapter as a whole—were up-to-date as of late summer 1992, but new models come out frequently; for example, just as we were going to press,

the PowerBook 140 was replaced by the PowerBook 145 (which is faster and cheaper). We cover all these new machines in our free updates, so be sure to tell us where to send them.



The black models are still being made; the gray ones are discontinued.

The *processor chip* is the brains of a computer, where the computer actually makes its calculations. It's also called the *processor*, the *microprocessor*, the *CPU* (for *central processing unit)* or simply the *chip*. (Be aware that the term *CPU* is sometimes also used to refer to the Mac itself, as distinct from the keyboard, mouse, external monitor, etc.)

Macs use Motorola processors—the 68000, 68020, 68030 and 68040 (for some reason, no 68010 ever hit the market). In general, the higher the number, the more advanced the chip's capabilities. In terms of raw processing power, the 68020, 68030 and 68040 correspond roughly to the 286, 386 and 486 chips produced by Intel for IBM compatibles.

A *coprocessor* is a second chip that specializes in math, graphics or some other specific kind of computation. When the main processor receives the kind of job the coprocessor specializes in, it hands off the job to the coprocessor, which takes care of it faster than the processor could and then sends back the answer.

Common coprocessor chips used in Macs are the 68881 and 68882, both of which specialize in mathematical computation, and the 68851, more commonly known as the PMMU (for *paged memory management unit)*—which, as its name implies, helps manage memory efficiently. The 68030 contains the PMMU (except for the 68ec030 chip used in the Outbound 2030E, which doesn't have a PMMU and can't accept one.)

The operations of the processor chip are synchronized to pulses generated by a vibrating quartz crystal. The frequency of these pulses is called the computer's *clock speed* or *clock rate* and is measured in *megahertz*—millions of cycles per second (abbreviated *MHz).*

On the chart on page 96, we give the clock speed in round numbers. That's the normal practice, but be aware that it's not precise. For example, 8 MHz is actually 7.83 MHz.

You should also be aware that clock speed alone won't tell you how fast a computer is. The 68030 chip not only thinks faster than the 68000, it also moves twice as much data at a time, in 32-bit instead of 16-bit chunks. (That's one reason the old Mac Portable, with its 68000 chip, was slower than other 16-MHz Macs.) The 68030 has a PMMU chip built in, and that speeds things up too. The 68040 has further advantages over earlier processors.

Three other factors are important to a Mac's performance—how much ROM it has, how much RAM you can stuff into it and how many expansion slots it has. We'll discuss each of these in turn, then summarize them in a table.

mostly for beginners

ROM stands for *read-only memory*. It's the information that's built into the computer and doesn't need to be loaded in from disk. An increase in ROM size (from 512K to 1MB, say) makes the Mac smarter and capable of doing more things (or able to do the same things faster).

(Like many words, *ROM* can be used to refer to either stuff or things. When you say, *How much ROM does it have?*, you're referring to the total amount of read-only memory, considered as undifferentiated stuff; when you say, *It has the new 1MB ROMs*, you're referring to things—the chips themselves.)

RAM stands for *random-access memory*, but it's more meaningful to think of it as *read/write memory*—memory you can both write data into and read data out of. A computer's RAM is the working space in which you create and modify documents and do other work. Most RAM is *volatile*, which means the information stored in it is lost each time you turn the power off.

Because all programs work at least partially in RAM, how much RAM a Mac has affects not only how fast it functions but also how many applications you can have open at one time, how big a document you can work on, etc.

RAM chips usually come packaged in SIMMs, *single in-line memory modules*. The SIMM protects the actual memory circuits and contains the little prongs with which the chips plug into the computer. (For more about RAM, see the first entry in Chapter 3. For more about SIMMs, see the section on memory upgrades toward the end of Chapter 3.)

A Mac's RAM maximum depends on what kind of SIMMs it can use and how many SIMM sockets it has (some models also have one or two megs of RAM soldered into place). Manufacturers keep cramming more and more RAM onto memory chips; as of this writing, a single SIMM can have as much as 16 megs of RAM on it. (The more memory a SIMM contains, the *denser* we say it is.)

68000 machines can't handle SIMMs denser than a meg, so the Classic's four sockets give it a maximum capacity of four megs of RAM. Machines based on the 68020, 68030 and 68040 chips vary in what they can handle. For example, the Classic II can take 4MB SIMMs, so its two sockets give it a maximum of ten megs (counting the two megs of RAM that come soldered in).

The basic reason a given Mac can't handle denser SIMMs is that it has to be able to *address* RAM to be able to use it *(addressing* means keeping track of where each piece of information gets put). All Macs can address at least 8MB (even though some only have room for 4MB).

System 6 requires a program called Optima (or the equivalent) to utilize more than 8MB. In addition, the II, IIx, cx and the SE/30 require software called Mode32 (available free from Apple dealers, users groups and bulletin boards) that fixes a problem in their ROMs.

(When Apple released the II, IIx, cx and SE/30, they claimed they'd eventually be upgradable to 128 megs of RAM, but then their ROMs turned out to be flawed. Now Apple is trying to be more cautious, so the maximum RAM capacities they claim for some of their newer models are conservative. But often you can actually put more RAM in them than Apple says, and where we know about that, we've included the higher figures in the table on page 102.)

The ability to address more than 8–12 megs is built into System 7, and is called *32-bit addressing*, but it only works on Macs with PMMU chips. (As mentioned above, the PMMU is built into 68030 processors, and it can be added to the 68020 processors in the original Mac II and the LC.)

Expansion slots are fittings that let you add *cards* inside the Mac that do special tasks, like accelerate your computer or run a large monitor. There are two basic kinds—Processor Direct Slots (PDSs) and NuBus slots.

A PDS connects the card plugged into it directly to the CPU, which makes it fast. A Mac can only have one PDS; the SE, SE/30, Portable, LC, LC II, IIsi, IIfx and all the Quadras have them. PDSs in different models are generally incompatible with each other, which is why there are far fewer PDS cards than NuBus cards.

Apple's NuBus structure is almost unique in the computer world, for two reasons—you can put a NuBus card into any slot you want, and the cards don't have to fight over which has priority. The Mac handles all the *traffic* (the signals to and from the boards) and decides who goes first. The Quadras' NuBus slots can transfer data twice as fast as regular NuBus slots, but the cards to exploit that potential speed don't exist yet.

In addition to these two basic kinds of slots, various Macs contain special sorts of slots for extra memory, cache cards, modems, etc.

While fewer expansion slots do limit a model's expandability, Apple is incorporating more and more features into the *motherboard* (the main board into which all the chips and cards are plugged), so you may not need as many slots. For example, the si has built-in support for a color monitor, so its one expansion slot is still available for some other use (although using the built-in color support slows the computer down).

The table on the next page shows you the size of the ROM, the maximum amount of RAM and the number and kind of expansion slots for every Mac ever made (as of this writing—to stay up-to-date, send in for your free updates). The models are grouped by processor, and we give you the clock speeds too.

The last column tells you if the computer is a compact, modular or portable. Models that are still being made are shown in boldface type.

(We left the rest of this page blank so the table would all be on one page.)

Mac model	ROM	max MB of RAM[1]	clock speed	PDS	NuBus slot(s)	type
68000 processor						
128K	64K	1/8	8			C
512K	64K	1/2	8			C
512Ke	128K	1/2	8			C
Plus	128K	4	8			C
SE	256K	4	8	1		C
Portable	256K	10	16	1		P
Classic	**512K**	**4**	**8**			**C**
PowerBook 100	**256K**	**8**	**16**			**P**
Outbound 2000	[2]	**4**	**20**			**P**
68020 processor						
II	256K	128[3] (8)	16		6	M
LC	512K	10	16	1		M
68030 processor						
SE/30	256K	128 (8)	16	1		C
IIx	256K	128 (8)	16		6	M
IIcx	256K	128 (8)	16		3	M
IIci	**512K**	**128 (32)**	**25**	**1**	**3**	**M**
IIfx	512K	128 (32)	40	1[4]	6	M
IIsi	**512K**	**65 (17)**	**20**	**1[5]**	**1[5]**	**M**
Classic II		**512K**	**10**	**16**		**C**
LC II	**512K**	**10**	**16**	**1**		**M**
PowerBook 140	**1MB**	**8**	**16**			**P**
PowerBook 170	**1MB**	**8**	**25**			**P**
Outbound 2030	[2]	**4**	**20**			**P**
Outbound 2030E	[2]	**14**	**25**			**P**
Outbound 2030S	[2]	**14**	**33**			**P**
68040 processor						
Quadra 700	**1MB**	**68 (20)**	**25**	**1[4]**	**2**	**M**
Quadra 900	1MB	256 (64)	25	1[4]	5	M
Quadra 950	**1MB**	**256 (64)**	**33**	**1[4]**	**5**	**M**

1. *These figures are for the densest SIMMs the model will accept (as of this writing), installed on the Mac's motherboard in a slot designed for that purpose. If Apple says a machine will take less RAM, their figure is in parentheses.*

2. *Outbounds are not made by Apple. They use reclaimed 128K and 256K ROMs that are then customized and enhanced. The Outbound 2030E doesn't use a true 68030 chip.*
3. *The Mac II requires the upgrade to a SuperDrive (in order to get the 512K ROMs) in order to use 4MB or denser SIMMs.*
4. *Filling the PDS blocks one of the NuBus slots, so you can use a total of six cards on the fx, two cards on the Quadra 700 and five cards on the Quadra 950.*
5. *With an optional adaptor card, the si can take either a PDS or a NuBus card (without the adaptor, it can't take either).*

One other basic way Mac models vary is in their audio and video capabilities. Here's a table detailing them (with explanatory notes following):

Mac model	sound input	sound output	built in video
Plus, SE, Classic	no	mono	no
SE/30	no	stereo	no
Classic II	mono	mono	no
II, IIx, IIcx, IIfx	no	stereo	no
IIci	no	stereo	yes
LC, LC II	mono	mono	yes
IIsi	mono	stereo	yes
Quadras	stereo	stereo	yes
Portable	no	stereo	no
PB 100	no	mono	no
PB 140, 170	mono	stereo	no

Sound input is the ability to record sounds without additional hardware; these computers come with a microphone. *Built-in video* means you can plug a monitor into the Mac without having to install a *video card* (for more on all these terms, see the monitors section below). Which monitors are supported by which Macs is discussed below.

mostly for beginners

The si, the LCs and the Quadras use separate *VRAM (video RAM)*, but the ci uses its own regular RAM, which means that hooking a monitor up to it without a video card tends to slow down the ci's other operations. But even with

separate VRAM, the built-in video on all Macs but the Quadras is slower than what you'd get with a video board.

The ci's and si's built-in video can support 8-bit color (256 colors) at 640x480 pixels—for example, on an Apple 12" or 13" monitor—or 4-bit grayscale on Apple's Portrait monitor.

The LC and LC II come with 256K of VRAM, upgradable to 512K. With the built-in 256K, they can handle (for example) 8-bit color or gray-scale on Apple's 12" monitors. With 512K of VRAM, they can handle up to 16-bit color (about 33,000 colors).

The Quadra 700 comes with 512K and the 950 with one meg of VRAM (as did the 900); they're all upgradable to two megs of VRAM. Both the 700 and 900 support 24-bit color on all Apple monitors through the 16", but only 8-bit color on the Apple 21". The 950 with the full two megs of VRAM will support 16-bit color on the 21".

While the Classic II and the PowerBook 140 and 170 don't have built-in video, they do have color QuickDraw built into their ROM, which means you can get an adaptor that lets them drive external color monitors. It also means they can run QuickTime movies, although the picture won't be very good.

✎ *basic guidelines* *(AN/ND/HK/JK/DH)*

In the following entries, we discuss all of the Mac models—first current ones, then past ones. Since there are still lots of discontinued machines around, we use the present tense when describing them, except when we're writing specifically about something that happened in the past. We don't normally repeat information already shown in the table and chart above, unless we want to make a point about it.

The prices we show below (and everywhere else in the book) are simply intended to give you the roughest general idea of how the costs of various machines compare, at list,

as of this writing. Actual prices are likely to be different by the time you read this, so don't rely on the ones we quote.

All the models Apple is currently shipping come with System 7 (except one—the LC II without a hard disk). The only ones that work with earlier versions than System 7 are the si, the ci, the original Classic and the LC II. (The PowerBook 100 will also run System 6.0.7, but Apple advises against it and doesn't offer tech support for it.)

But be aware that the two megs of RAM you get in less expensive Classic IIs and PowerBooks are inadequate for running more than one program at a time under System 7; in fact, you won't even be able to run one large application. They aren't really useful machines until you add more RAM.

names and numbers *(SA/AN)*

Some Mac models have numbers as part of their names—the PowerBook 170, the Quadra 950, the IIsi, etc. But when you see an arabic number before a *slash*, that generally indicates the number of megabytes of RAM in the machine, and an arabic number following a slash generally indicates how many megs are on its hard disk. (Usually the number before the slash is 17 or less and the number after the slash is 20 or more.) Thus a Mac IIci 5/80 has five megs of RAM and an 80-meg hard disk.

The SE/30 violated that naming convention, since the *30* after the slash referred to its 68030 processor chip, rather than to a 30-meg hard disk. Apple typically used an *x* to indicate the 68030 chip—as in IIx, IIcx and IIfx—but they apparently didn't think we could handle a machine called the *Macintosh SEx*.

the Classics *(ND/HK/JK/DH/AN)*

With a list price of just $1000 (including the keyboard), the original Classic was the least expensive Mac ever. Currently you can get one with a built-in 40-meg hard disk and four megs of RAM (the maximum it will take) for $1500.

Although the Classic's 9" screen and relatively slow speed are a problem for many applications, it's a great computer for Mac beginners. People whose budgets would have left them with no choice but to buy a PC can now get a Mac instead. (Hook them on this cheap Mac, Apple figures, and before they know it, they'll be stealing the milk money to buy a Quadra.)

The Classic II runs twice as fast as the original Classic, and you're less likely to outgrow it. For $1550, you get two megs of RAM and a 40-meg hard disk. But two megs of RAM isn't enough, since the Classic II requires System 7. With four megs and a 40-meg hard disk, it lists for $1700, and with an 80-meg hard disk for $1850.

Unfortunately, the Classic II wasn't engineered to fully exploit the power of the 68030 chip, and it isn't as powerful as the SE/30 it was designed to replace (because data can't travel between the CPU and memory as fast). Power-hungry software like graphics and publishing programs, big databases and spreadsheets make the Classic II seem sleepy.

The Classic II can use System 7's virtual memory and 32-bit addressing, so you can upgrade RAM up to ten megs and use your hard disk to increase memory even further. But it's still got just a 9" screen, and since there's no expansion slot or video port, the only way to add an external monitor is to buy an expensive third-party adaptor. These limitations may lead you to buy a new machine if you ever need more than the Classic II's basic features.

the LCs *(DH/AN)*

The Mac LC was designed for people who want to hook a Mac up to a color monitor at the lowest possible cost (in fact, its name stands for *low-cost color).* The LC II is somewhat faster and more powerful, but is otherwise similar. Both machines have a Processor Direct Slot, but you can't use cards made for one in the other.

Both LC models can run three Apple displays directly, without an additional video card. But an optional VRAM (Video RAM) SIMM ($175) boosts the number of colors (or shades of gray) available on a given monitor from 16 to 256, or from 256 to 32,000. And with the addition of a simple and inexpensive adaptor, you can hook either LC up to the standard VGA color monitors made for PCs, which are ubiquitous and cheap.

There are also cards made for the LCs that let them run virtually all the programs written for the Apple IIe (there are tens of thousands of them, mostly in the areas of education and entertainment). This makes an LC ideal for a family with kids—assuming the family also knows how to settle arguments over who gets to use the computer now.

The difference between an LC II and an LC isn't dramatic because, like the Classic II, the LC II doesn't fully exploit the power of the 68030 chip. But then the price difference between the LC II and the LC isn't dramatic either—in fact, it's nonexistent. An LC II with four megs of RAM and an internal 40-meg hard disk lists for the same $1700 as a similarly equipped LC did before the LC II was introduced. With an internal 80-meg hard disk and the VRAM SIMM, an LC II lists for only $1850, and that's actually less than a comparable LC used to cost.

the IIsi *(AN/DH)*

A nice feature, first introduced on the si and the LC (don't ask us why one name is capitalized and the other isn't), is the ability to input sounds. Both machines come with a microphone and some very easy-to-use software that lets you replace various beeps the Mac makes with any sound or message you want. (The Classics and Quadras now have this feature as well.)

For example, you can record yourself (or someone else) saying "guess again, bozo" into the mike and have the si use that instead of a beep whenever it tells you

that you can't do something. You can even add voice comments to files.

We bought several si's for the office and the people who've used them have been very happy with them. (There's no official story on where the name si came from, but according to one anonymous source, it's supposed to stand for *simply irresistible.)*

A $250 adaptor card gives the si a single expansion slot; it can be either a NuBus or a PDS card. And the adaptor includes a 68882 coprocessor chip that speeds the si up. (You can accelerate things even more with DayStar's Fast Cache card, which runs $430, or $530 with a coprocessor chip on it.)

With three megs of RAM and a built-in 40MB hard disk, a IIsi lists for $2500. With five megs of RAM and an 80-meg hard disk, it lists for $3000—a full $1000 less than a comparably equipped ci.

the IIci *(AN/Mac Kenny)*

Running at 25 MHz, the ci is quite a bit faster than an si. All recent ci's include a *RAM cache card* that speeds them up even further, by storing recently used programs and data in memory instead of on disk. (You can accelerate earlier ci's with third-party cache cards like the DayStar's Fast Cache.)

The ci's speed comes in handy if you work with large databases or spreadsheets, complex graphics, detailed scans, or two-page spreads in page layout programs. And it has some advanced capabilities—32-bit addressing and built-in 32-bit QuickDraw—that give it real advantages under System 7.

The ci is relatively small (about 12" by 14" by 5.5") and contains three slots. In a way, it has four slots, because its built-in video lets you use monitors up to 640 x 870 pixels without having to install a separate video card. But

be aware that running a gray-scale or color screen off the built-in video slows things down a lot; for those monitors, you might want to get a separate video card.

There is a way around the slowdown. If you upgrade the RAM on a IIci, leave the 256K SIMMs in bank A and put larger SIMMs in bank B. That effectively forces the Mac to use bank A as VRAM, and means you can drive a monitor off the built-in video without slowing the ci's other operations. (But the ci will still use the RAM in bank A for other tasks if it runs out of RAM in bank B.)

As of this writing, the ci lists for $3300 with five megs of RAM and no hard disk. An internal 80MB hard disk brings the price up to $4000 and an internal 230MB hard disk takes you to $4600. You can also get a model with four megs of RAM, an internal 80-meg hard disk and parity checking (if you don't *know* you need it, you don't) for $4400.

the Quadras *(ND/HK/JK/DH/AN)*

In Ken Kesey's fabulous novel, *One Flew Over the Cuckoo's Nest*, Randall McMurphy describes himself as "the bull-goose loony." Well, Quadras are the bull-goose Macs.

Using Quadras for most common Mac tasks is like shooting at flies with a bazooka (except it's easier on your walls). But for working with 24-bit color documents or animation, serious number-crunching or network file serving, they're the way to go.

Thanks to their 68040 processor chips and other design improvements, Quadras can perform up to twice as fast as fx's in certain specific situations (though they certainly are nowhere near that much faster overall).

Unfortunately, not all programs work with the 68040 chip. Apple provides a control panel that tells the 68040 to pretend it's a 68030; this lets you run incompatible programs but slows the Quadra down to ci speeds, so

you're sort of throwing the baby out with the bath water. By the time you read this, however, many more applications will have been updated to work with the 68040, so the Quadras can run them at full speed.

Quadras will run color monitors without cards; like the LCs, they'll even run VGA monitors. The 950 has built-in 24-bit color, which gives you millions of colors, and using it instead of an additional video card won't slow other operations down either—though on a monitor larger than 13", you probably will need a video card to get 24-bit color.

Because Apple expects the Quadras to be incorporated into many local-area networks, they're the first Macs to come with Ethernet built in (see Chapter 17 for more about this). The 950 can be locked on (to prevent accidental shutdown when it's serving a network) or off (to prevent tampering).

The Quadra 700 can take one PDS and one NuBus card (or two NuBus cards) plus two additional storage devices inside the case. The Quadra 950 can take one PDS and four NuBus cards (or five NuBus cards), plus three additional internal storage devices. Once cards are available to exploit their improved NuBus slots, data will transfer twice as fast as in normal NuBus slots.

List prices for the Quadra 950 are $7200 for 8MB of RAM and no hard disk, $8500 with 230MB hard disk and $9200 with 400MB hard disk. A Quadra 700 with 4MB of RAM and no hard disk lists for $5700. With an 80MB hard disk, it's $6400; with a 230MB hard disk, $7000; and with a 400MB hard disk, $7700.

Apple replaced the Quadra 900 with the 950 less than six months after the 900 was introduced. It was basically like the 950, except that it ran at 25 MHz (like the 700), instead of the 950's 33 MHz.

the PowerBooks *(ND/HK/JK/DH)*

The three PowerBooks—the 100, 140 and 170—are the first truly portable Macs, weighing less than seven pounds each (a third as much as the discontinued Mac Portable). With footprints about the size of an 8½ by 11 sheet of paper, they'll fit into a briefcase or rest comfortably on your lap.

The PowerBook's LCD screens are backlit—unlike the Portable's—so they're easy to read in any light. But on the 100 and 140, the pointer and other objects leave shadowy "speed trails" when you move them around. Even worse, moving the pointer at virtually any speed results in its *submarining*—disappearing from the screen entirely until it catches up with the mouse. Many people find both these problems very annoying.

The 170's screen is the same kind used in the Portable; the pointer doesn't submarine and you don't get speed trails. In addition, the 170's screen can be viewed comfortably from a wider angle.

Instead of mice, the PowerBooks have trackballs in front of the keyboard, although you can plug in a mouse too. (For more on trackballs, see the *Mice and mouse substitutes* section below.) The 100's trackball is generally considered to be inferior to those of the other two models.

The keyboards themselves are smaller than normal, and many people, fast touch-typists in particular, find that a real problem. The keyboards have no numerical keypad. *[Yea!—AN]*

All the PowerBooks can run on either household current or their own rechargeable batteries. Depending on disk drive activity and screen brightness, their batteries last two to three hours (or up to four hours, in the case of the 100) between charges. Like the Portable, they all go into a power-saving *sleep* mode when you leave them idle. The 170 also has a low-power mode you can turn on while you're

using it; it gives you an extra 20 or 30 minutes by slowing the hard drive and processor and dimming the screen.

PowerBooks generally perform about the same as similarly powered nonportable Macs, although their screens are slower. With its 16-MHz 68000 processor, the PowerBook 100 is much faster than the Classic. The 140, with its 16-MHz 68030, is comparable to an SE/30, IIx or cx and the 170, whose 68030 runs at 25 MHz and has a math coprocessor, performs more or less like a ci.

Unlike the 140 and 170, which can only run System 7, the 100 can run System 6.0.5 or 6.0.7, which allows you to get by on the two megs of RAM the machine ships with and lets you run applications that aren't System 7-compatible. *[System 6.0.5 is OK, but don't use System 6.0.7; it's notoriously buggy.—AN]*

The 100 is the only Mac whose hard disk can be connected to another Mac with a SCSI cable (which is called *docking*). If you've got a desktop Mac as well, this lets it access the 100's hard disk, so you don't have to transfer files back and forth on floppies. The 100 is slightly smaller than the other PowerBooks (its screen measures 9" diagonally rather than 10") and it's nearly two pounds lighter, mostly because there's no internal floppy drive.

A 100 with 2MB of RAM, a 20MB hard disk and an external floppy drive (which weighs about a pound) lists for $1600. You can also get a 100 with 4MB of RAM and a 40MB hard disk for $2200—or $2400 with an external floppy drive.

Its docking ability, small size, light weight and long battery life make the 100 ideal as a mobile supplement to a more powerful Mac at home. Some people think that these qualities make it the portable of choice, regardless of price.

The 140's screen has the same technology as the 100's, but with a different sort of lighting (some people prefer one screen and some the other). The PowerBook 140

comes with a floppy drive built in. There are four combinations of RAM/hard disk capacity—2/40 for $2700, 4/40 or 2/80 for $3000 and 4/80 for $3300—but we recommend starting off with four megs of RAM. Upgrading later is costly, since the PowerBooks use special RAM expansion boards that, at this writing, cost $300 (list) for two megs and $550 for four!

If you need a laptop you can work at for long stretches, or rely on for demanding applications, the 170 is probably what you want. You can get either a 2/80 or a 4/40 for $4300, but here again, you'd be wise to start with four megs of RAM. For $4600, you get four megs of RAM and either an 80-meg hard disk or a 40-meg hard disk plus a built-in 2400-baud modem, which can also send faxes at 9600 baud (it's a $350 option on the 100 and 140).

Putting a modem in a portable computer makes a lot of sense; unfortunately, this particular one hasn't been getting good reviews. It isn't fully Hayes-compatible (see *Telecommunication basics* in Chapter 17) and has difficulty communicating with some electronic bulletin boards.

the Outbounds *(DH/ND/SM)*

Back when the Portable was the only portable Mac that Apple made, Outbound already had a line of products that were smaller, lighter, faster and cheaper. Not surprisingly, many people bought them. The PowerBooks have altered the landscape dramatically, but there are still reasons you might choose an Outbound over a PowerBook.

For one thing, Outbounds have full-size keyboards. How significant this is depends on you. Some people seem to adjust to PowerBook's smaller keyboard without undue difficulty, while others dislike it intensely. The only way to know which category you belong to is to try the things out—preferably for an extended period.

very good feature

The Outbounds' other major selling point is their upgradability. It's much simpler and cheaper to upgrade a given model of Outbound than it is to upgrade a PowerBook.

Instead of a trackball, Outbounds have an unlikely-looking device called a *trackbar* mounted in front of their keyboards. You move the pointer by sliding the isobar side to side or rolling it forward or backward. It's a fascinating device and Outbound should get points for creative design, but it takes some getting used to.

As of this writing, Outbounds come in twenty-six different configurations of processor, speed, RAM and hard drive. List prices range from $2000 for a 20MHz 68000 processor with two megs of RAM and a 20MB hard disk, to $6050 for a 33MHz 68030 processor with fourteen megs of RAM and a 120MB hard disk.

Be aware that the Outbound 2030E models use the 68ec030 chip. Unlike the regular 68030, it doesn't contain a PMMU chip and can't be upgraded to take one.

Newton *(AN)*

things to come

Sometime in 1993, Apple is planning to bring out a pen-controlled, hand-held computer called Newton. Developed in conjunction with Sharp, it will be a combination electronic calendar, phone book, notebook, sketch pad, calculator and modem, and will use an infrared beam to send and receive data over a distance of six feet.

In introducing Newton, Apple president John Sculley projected—now get this—a $3.5 *trillion* market for it and its competition. Since that comes out to about $600 for every woman, man and child on earth—Mongolian yak herders, Aborigines on walkabout, *everybody*—it seems a bit optimistic to me. But what do I know?

gossip/ trivia

You may remember that one of Apple's ads from the late seventies featured the famous scene in which Isaac Newton supposedly watched an apple fall—or, in the more

rowdy version, bounce off his head—and thought, "Hey...gravity! I'd better figure out some laws to explain it." The point of the ad was that Apple was as intelligent and creative as Newton, or as the apple that fell on his head, or something like that. I assume that that's why this new computer is called Newton.

(This apple-falling story has to be the most apocryphal in the entire history of science. It asks you to believe that Isaac Newton, with an IQ of 379 or something—and that's in 17th-century IQ points; adjusting for inflation, his IQ would be well over 500 today—needed to see an apple fall from a tree to be reminded that gravity was a subject worth thinking about.)

Anyway, this new little computer looks neat—even if it does mean that I'll have to learn how to write with a pen again. Say, I've got an idea! Why don't they put a keyboard on it—and, while they're at it, a big screen—and then we can put it on our desks?

the Performas *(AN)*

As we go to press, Apple is planning to sell the Mac LC II and Classic II, along with some packaged software, at consumer chains like Sears and Price Club. But they won't be called Macs—they'll be called Performas.

(Acura was a great name for a car but, as with many clever ideas, it seems doomed to be endlessly imitated by the creatively handicapped. I thought the Oldsmobile Achieva was as bad as it could get, but I can see now that I was being foolishly optimistic. I suppose soon we'll have to live with names like Prestiga and Distincta. In Chicago there'll no doubt be some product called the Clouta.)

Apparently the main difference between Performas and Macs will be *pro forma* (now there's a more accurate name)—where the machine is sold and what software comes with it. The LC II and Classic II will also continue

to be sold under their current names, without the bundled software, in computer stores.

There will also be two new machines in the Performa line, probably with 32MHz 68030 processors and three NuBus slots (which makes them more or less equivalent to supercharged ci's). One of the models will have a CD-ROM drive built in.

For more details on the Performas, Newtons and all other new Mac developments, be sure to send in for your free updates. They aren't some kind of advertising gimmick—they really are informative little booklets. (In fact, we're thinking of calling them the Informas.)

the Portable *(AN)*

Expensive ($5800—$7000) and heavy (more than 20 lbs for the hard-disk model), the Mac Portable was destined for the dumpster of history. But it has some endearing qualities.

Its screen is crisp (although not backlit) and it refreshes fast enough for the pointer not to disappear or leave a "speed trail," even when moved quickly (a problem with many portable computers). Although the Portable's screen is physically smaller than the screen on compact Macs, it displays 46% more information—the whole width of a letter-sized page, for example—thanks to smaller pixels (dots).

A sophisticated power-management system and special low-power RAM chips maximize battery life. You can plug a Portable into the wall without an adaptor virtually anywhere in the world, since it automatically handles 85–270 volts and 48–62 Hz (cycles per second). (The US uses 110 volts and 60 Hz, but many foreign countries use 220 volts, 50 Hz or both.)

All in all, the Portable is a pain to lug around but a joy to use. As a portable, any one of the PowerBooks is a much better machine. But now that the Portable has been

discontinued, you can get one for as little as $1000. Some companies have even added a (much-needed) backlit screen, and with the new denser SIMMs, you can upgrade the Portable to ten megs of RAM.

What the hell—just pretend it's a regular Mac, set it up on your desk and leave it there (it's too heavy to move anyway). You could do worse.

the IIfx *(AN)*

The fx was unceremoniously knocked from its position at the front of the Mac pack by the Quadras, but it's still a very fast machine. Its 68030 chip runs at 40 MHz—twice as fast as an si, *five* times faster than an SE or a Plus—but the speed improvement is even greater than that, thanks to 32K of RAM cache and enhanced hard disk access.

I'm using an fx to edit this book, and feel no need to upgrade to a Quadra, even though I'd jump at anything that would get this colossal project over any sooner. Yes, Quadras are faster in some applications, but the speed difference isn't really significant unless you're doing high-end stuff. The greatest demand I put on my fx is laying out two-page spreads in black-and-white, and for that, the fx is more than adequate.

The fx's variable-speed fan is nice and quiet. It has six NuBus slots—one more than the Quadra 950 and four more than the Quadra 700. Like the Quadras, it also has a PDS and, like the Quadras, putting a card in it blocks one of the NuBus slots. Like the II, IIx and IIcx, the fx requires a video card to connect to a monitor.

the Mac II, IIx and IIcx *(SA/AN/DH/Mac Kenny)*

The original Mac II (that is, the one that was just called "Mac II" without any letters after the numerals) was built around the 68020 processor chip, which puts it off in left field, with only the LC for company. The II was the last

of the Macs to come with the old 800K floppy drive (you can upgrade it with an Apple SuperDrive for $450).

Buying a used Mac II may be worth doing if you get a good deal on it, but be aware that you're probably going to want to upgrade it at some time—if not immediately, then in the not-too-distant future.

Apple's upgrade from a II to a IIfx lists for just $2600. Since you can probably get a Mac II for around $1500, buying a used II and upgrading it may be the cheapest way to get the power of an fx in your hands (although you'll also need the SuperDrive upgrade). The II's six NuBus slots mean you can add all sorts of functionality to it.

The IIx is built around a 68030 processor chip and a 68882 coprocessor; like the II, it has six slots. The IIcx is similar, except that it's the size of a ci and has only three slots. You have to buy a separate video card to connect a monitor to any of these computers.

the SE and SE/30 *(SA/AN/Mac Kenny)*

The original SE came with an 800K drive, but later models had a 1.4-meg SuperDrive. It was the first Mac to have a fan and ADB mouse and keyboard. The SE/30 is similar, but it's built around a 68030 processor chip running at 16 MHz, aided by a 68882 math coprocessor chip, which makes it about four times faster than the SE.

The SE/30 was the first compact Mac to offer advanced sound capabilities and stereo output, and its ROMs contain color QuickDraw, which means that with the correct video card in its one expansion slot, you can connect an external color monitor to it.

the Plus *(SA/AN/SM)*

The Plus was the last Mac to use the old-style mouse, and the last not to have a fan. Its pre-ADB keyboard includes a numeric keypad and arrow keys. It can take up to four

megs, but it wasn't designed to allow for things to be added inside—an internal hard disk, say, or a video card for an external monitor. That's not to say it *can't* be expanded—in fact, there's an entry on how to do that in the upgrading section below.

With a hard disk and some extra memory (which only costs about $40/meg), the Mac Plus can be a viable system for word processing and other undemanding tasks (undemanding on the computer, that is—not on you). But its small screen and slow speed make it far from ideal for page layout, graphics or large spreadsheets.

❦ *the original Macs* (AN/SA)

The original 128K Mac and its immediate successor, the 512K, had single-sided (400K) floppy-disk drives. The 512Ke (for *enhanced)* had double-sided (800K) drives.

The keyboards that came with these models didn't have numeric keypads or arrow keys, but you could buy a separate numeric keypad. This was a much better system than the current one-size-keyboard-fits-all approach (two-sizes-fit-all, actually—too big and way too big). All three models were fanless, allowing you to work in blessed silence.

While the classic Macs still work fine if you use the software that was current back when they were made (1984–85 or so), virtually no recent versions—including System 7—will run on them. There used to be ways to upgrade them, but most of the kits for doing that aren't being sold any more.

❦ *the Lisa* (AN)

I fell in love with Macs before there were Macs, back in the days of the Lisa. At $10,000, the Lisa was way too expensive to succeed, but it introduced virtually all the features of the Mac interface and implemented them well—sometimes brilliantly. (I wrote a book about the Lisa, the only one I've ever seen; other authors were

apparently more plugged in than me and found out that Apple was going to stop making Lisas.)

Although not many Lisas were sold, there are still some kicking around, and since they're orphan machines, they tend to be priced quite low. In a previous edition of this book, I remarked that a used Lisa could be a bargain.

A reader named Hector Lareau bought one as a result, and feels that it is "a grand machine." Buying a Lisa obviously involves sacrificing upward compatibility, but Mr. Lareau contends that things really aren't so bad:

> While the Lisa can't run System 7 yet, it can run almost anything useful under System 6.0.3. MacWorks [the software that shows a Lisa how to emulate a Mac] is being upgraded to at least System 6.0.7 compatibility for any program that a Plus could run (except for those that access the sound chip). A 16 MHz 68000 accelerator is available that pushes the Lisa close to the performance of a Mac II.
>
> Most importantly, the keyboard for the Lisa is the best thing anybody ever laid a finger on. (It does have a numeric keypad, but then so do all the Mac keyboards.)
>
> As for sources for Lisas, I've had miserable experiences with Sun Remarketing. After selling Lisas to scads of people who thought they were going to provide support, Sun decided to leave the Lisa to die in the desert of System 6.0.3.

> I recommend Sam Neulinger of Dafax Processing [contact info is in Appendix B]. Formerly the editor of a Lisa magazine, Sam has been a great help to me in upgrading my Lisa, which now has an 800K floppy drive, 2MB of RAM and a 20MB hard drive. He's the one doing the MacWorks upgrade.

Buying a Mac

basic considerations (DH)

The first question to ask yourself is—what will you use your Mac for? The average computer user does mostly word processing—even on a Mac, with all its sound and graphics capabilities. If you're typical, you probably don't need a super-fast CPU, a math coprocessor, six expansion slots, 128 megs of RAM, a 21" color monitor and a hard drive whose capacity is measured in gigabytes (you may *want* them, but you don't need them).

Try to figure out what software you'll be using and try it out on the computer you're considering. Imagine yourself performing those activities day in and day out, for months on end. Will the time it takes for the screen to redraw drive you crazy? Can you really see what you're doing on a 9" screen?

If you can afford it, it's a good idea to buy an expandable Mac. Then, if your needs change, you won't have to buy a whole new machine, but can upgrade your current one with some (relatively) minor hardware purchases. Consider the number of expansion slots (three are plenty for most people), the maximum amount of RAM you can put in the machine, and whether you can upgrade the CPU/clock speed.

Finally, remember that the Classic II, the PowerBook 140 and 170 and the Quadras require System 7. Stepping up to one of these machines means updating all your current software to versions that are compatible with System 7, and that can be a costly proposition. But of course that's not a consideration if the Mac you're buying is your first.

new vs. used Macs (DH/AN)

Though hardware prices continue to fall, Macs still cost more than yo-yos, and many people wonder if it isn't

smarter to buy one used. While there are obvious risks associated with doing that, Macs are pretty reliable. Far fewer than 1% of all Macs are shipped with faulty hardware (not counting disk drives), and most problems turn up within the first 90 days or so of use.

In any case, buying a new computer provides only limited insurance. Products have a way of failing just after the warranty runs out (though you can buy an extended warranty from Apple).

On top of that, some Apple dealers are—how shall we say this?—less than perfectly competent and dependable. If you lose many productive days because of repeated trips to the dealer and long waits for repairs, you may find yourself wondering why you shelled out those extra hundreds (or thousands) of dollars for a new-Mac warranty.

Some companies that sell reconditioned Macs offer warranties on them. Needless to say, these warranties are only as good as the company that stands behind them. Your local user group may know if the business is reputable, and you can also call the Better Business Bureau. If you really want to be sure, check at the local courthouse to see if there are any judgments filed against the company.

Another question to ask about a used Mac is whether Apple provides an upgrade path from it to a current model. If not, you're likely to have increasing difficulty finding compatible hardware and software as the years go on, in addition to the obvious problem of keeping up with the pack in terms of processing speed and power.

The next entry compares many new and used machines. For more on buying used Macs, see the entry after the next one. Upgrading is another route to consider; it's discussed in the next section.

the final cut *(DH/AN/SA/SM/JK/ND/Mac Kenny)*

When shopping for a Mac, most people narrow down their choices pretty quickly, then wonder if they could get something better for a little more money, or something adequate for a little less. To facilitate those decisions, here's a list of pairs (and one threesome) of similarly priced and powered Macs, both new and used, along with some of the factors you should think about when deciding between them.

The machines are listed more or less in order of increasing cost, except for the portables, which are at the end. We focus on features, not prices, in these comparisons. That's because prices are always changing, and because you don't need our help to consider prices, once you've weighed the features you want.

mostly for beginners

SE or Classic. There are those who maintain that the SE is a better engineered machine than the Classic; it was, after all, the top-of-the line in its day, while the Classic has never been more than an entry-level Mac. On the other hand, the Classic's power supply and hard drive are almost certainly superior. The two machines are virtually identical in computing power, and it's hard to justify spending as much on a used SE as on a new Classic—unless, of course, you need the SE's expansion slot.

SE or SE/30. The SE/30 is four times faster than an unaccelerated SE, and can be expanded to at least eight megs of memory, while the SE only goes to four megs.

Classic or Classic II. The Classic II is noticeably faster, and it takes up to ten megs of RAM, while the Classic only goes up to four megs.

Classic II or SE/30. Although the Classic II supposedly supplanted the SE/30, the SE/30 is considerably faster, and has an expansion slot to boot. On the other hand, you can't get a new SE/30 anymore (although there are rumors that Apple is thinking of rereleasing the SE/30).

things to come

SE/30 or some kind of Mac II. The SE/30 is obviously easier to move around, but the IIs' 3–6 slots make them more expandable. If you want a large screen, you'll have two screens with the SE/30 instead of just one—but that's actually an advantage, since it probably won't cost you any more to do that.

II or LC II. Despite its apparent obsolescence, the venerable II has its fans. The LC II comes out of the box with better features—notably, a SuperDrive, video support and enhanced sound capability. But the II's six expansion slots make it much more flexible. Put a Radius Rocket ($2000–$2500) or comparable accelerator into a II and you'll have a very powerful machine. Buy Apple's $2600 upgrade kit (and the $450 SuperDrive upgrade) and you'll have an fx.

II or IIx. Unmodified, the IIx's 68030 chip makes it a more powerful and versatile machine, and it has a 1.4MB floppy drive. You can upgrade it to an fx for $2600, but if you're going to do that, a II may be a cheaper place to start (even though you'll also have to spend $450 upgrading the II's floppy drive to 1.4MB).

Classic II or LC II. The processors and ROMs are the same, so the main question is, do you want a modular Mac, with a range of monitors to choose from, or a compact? If color is important to you, the LC II has it built in. The Classic II does have 32-bit QuickDraw in its ROMs, so in theory it can run a color monitor, but without an expansion slot, the monitor would have to be connected through the much slower SCSI port.

LC II or si. If you need color and your budget is limited, the LC II is probably for you. In addition to the cheaper CPU, you stand to save another several hundred dollars on the monitor, since the LC II will run a standard VGA monitor (with an inexpensive adaptor). On the other hand, the si is significantly faster and its color capabilities (as

shipped) are stronger. You can bridge the gap by buying a 512K VRAM SIMM for the LC II, but it costs $175. While both models have a single expansion slot, the si's is more flexible. And the si has stereo sound, while the LC II only has mono.

si or ci. The ci is faster, and comes with a coprocessor (it's only an option on the si). All recent ci's also have a cache card. The ci has three expansion slots to the si's one, and is upgradable to a Quadra 700. The si, while quite a spunky performer, is no match. You simply have to decide whether the ci's greater power and speed are worth the extra money to you. (Size might also be a factor—the si is significantly smaller.)

cx or ci. The ci is at least 50% faster than the cx, and another 20–30% faster with the cache card. It also comes with a built-in video card. You can upgrade from either to a Quadra 700, but if you're going to do that, it will probably be cheaper to start with a cx—especially since its power supply is said to be tougher than the ci's.

ci or fx. The difference is speed (25 vs. 40 MHz), although you may not need more speed than the ci can provide. The fx has six NuBus slots and one PDS, while the ci has only three NuBus slots (but most people don't need more than three). The ci is upgradable to a Quadra 700, but the fx isn't (and probably doesn't need to be).

fx or Quadra. Depending on what application you're running, a Quadra may be a lot faster than an fx, or only a little. Many programs can't fully exploit the Quadras' power, and while you're running them, the fx, with its 40 MHz clock speed, may actually be faster. On the other hand, the Quadras, with their 68040 CPU, faster NuBus slots and built-in Ethernet, clearly represent the shape of things to come.

Quadra 700 or Quadra 950. The 950's clock speed is almost a third faster than the 700's, and it has three more

slots. It can take three additional internal storage devices beyond its stock internal hard drive, while the 700 can only take two. You can cram the 950 with up to 256 megs of RAM vs. 68 megs on the 700's (although not too many people need 256MB of RAM). And the 950 ships with better color support. Basically, the contrast between these two machines is similar to the one between the si and ci—you can get more power, but you have to pay more for it (although here too, size might also be a factor—the 700 is quite a bit smaller).

PowerBook or desktop Mac. As a rule, you'll pay more for comparable power in a portable than in its nonportable equivalent, and you'll probably have to put up with a less desirable screen as well. So it only makes sense to buy a PowerBook if you really need the portability.

PowerBook or Mac Portable. In terms of portability, there's no contest—the PowerBooks win hands down. But only the 170 has a screen that compares to the Portable's, and the discontinued Portable is likely to be cheaper than even the 100. Once you get it to where you want it, the Portable is a nicer machine to use.

PowerBook 100 or 140 or 170. If you want a second Mac for word processing or other basic tasks while away from home, the 100 is light, inexpensive and plugs directly into your main Mac's SCSI port (but do upgrade the RAM to four megs if you're going to run System 7 on it). The 140 gives you more speed, a slightly bigger screen, a built-in floppy drive and complete System 7 compatibility. If you need high performance and a screen you can stare at for hours, get the 170.

buying a used Mac *(Larry Pina/DH/AN)*

Some good places to look for a used Mac are in classified ads in the daily newspaper, in free computer newspapers, on electronic Mac bulletin boards, at your local user group and at stores that specialize in used computers.

Used pricing can be hard to figure. Fortunately, some guidelines are available. The American Computer Exchange publishes a listing each month in *Macworld*, and the Boston Computer Exchange publishes a used computer price index (available at a small charge).

Try to get a 72-hour free refund or exchange; if you do, take the computer home, turn it on and let it run continuously for 72 hours, using it as much as you can during that time. If it crashes, take it back. That could indicate a problem with the motherboard (or other hardware).

Also try to get at least a 90-day warranty from the seller. If you don't get either, at least make sure you take the computer to a repair person for a look under the hood.

Choose *About This Macintosh...* on the menu to make sure you're getting all the RAM claimed. And use a utility like RAM Check to verify that all the RAM is in working order.

If the system includes a hard drive, reformat it and then run a utility like SCSI Evaluator or FWB's Hard Disk ToolKit to check for speed and bad sectors; if it finds bad sectors, the disk may not be reliable. This may take some time, but it's as good a way as any to put a machine through its paces.

Sometimes an otherwise perfect Mac will have a keyboard with one or more broken keys. Be sure to test them all. Stiff, sticky keys aren't much better than broken ones; they'll drive you crazy, and you'll have to fix them or get a new keyboard.

The mouse can sometimes be bad too. To test it, wiggle both ends of the cable as you move the pointer around the screen and click.

A used Mac may have almost any kind of internal hard drive (MiniScribe, Seagate, Sony, Quantum, etc.). Apple-labeled drives have had a lot of problems, so they're not

necessarily better than any of the others. If possible, buy a used Mac without any hard drive—or at least check it for bad sectors (as explained above).

The 800K floppy drives in Pluses, early SE's and early Mac IIs were built by Sony, but they're not all the same. The original ones have black labels and tend to have problems ejecting disks. More recent drives are more reliable; they have red labels. (You have to take the case off to see the labels.)

SuperDrives (they take 1.4MB floppies) have blue labels. If the drive will successfully format a 1.4MB disk, you know that the upgrade to a SuperDrive was complete.

To assess wear-and-tear on a screen, turn off the power. If you see a ghost of the menu bar on the black screen, it's near the end of its life.

While the screens on some Pluses and SE's are nonglare, on others they're very reflective. If you suffer from astigmatism, wear a white shirt or shine a flashlight at the screen. If you can clearly see your reflection, then using that CRT day after day may cause headaches and even backaches (because you'll be subconsciously twisting every which way in an attempt to minimize the glare).

To find out which kind of video card—if any—is in a used Mac, go to the Monitors control panel. You may only be able to select black-and-white, which means it's got a 1-bit card. If you can select 16 colors (or shades of gray), it's got a 4-bit card. If you can select 256 colors, it's got an 8-bit card. If you can select millions of colors, it's got a 24-bit card. The more bits—and colors—the better.

Click the *Options* button. If it says *Macintosh II Video Card*, the card is low-resolution. If it says *Mac II High Resolution Video Card* or *Macintosh Display Card* (the most advanced), it's high-resolution and will work better with NTSC and PAL video equipment like camcorders, VCRs

and TVs. (Of course, it may not be an Apple board at all, in which case you'll have to call the dealer or a manufacturer to find out what that specific board can do.)

Here are some other things to look for on specific Mac models:

Pluses. The first Mac Pluses came in a beige case; then Apple switched to "platinum" (gray). Make sure the on/off switch of a platinum Plus is also platinum. If it's beige, that means the power supply was swapped for an earlier, less reliable one.

Real Mac Pluses are marked *Macintosh Plus* to the left of the floppy drive slot. If those words aren't there, it's a 128K or 512K Mac that's been upgraded, and those have the earliest, least reliable power supplies of all.

A Mac Plus may have one of three ROM versions. Versions 1 and 2 don't work very well with SCSI drives. To tell which a given Plus has, boot from a floppy and press the interrupt button. This puts you in the Mac's built-in debugger.

You'll see a >. Type DM4000000 after it and hit Return. The ROM version will be shown in the second and third columns of the top row. 4D1E EEnn indicates version 1, 4D1E EAnn indicates version 2 and 4D1F 81nn indicates version 3 (the one you want). To exit the debugger and return to Finder, type G and then Return.

SE's. A black on/off switch indicates a Sony power supply. They're much more reliable than Astec power supplies, which have white switches.

Early SE's have a squirrel-cage fan that tends to be annoyingly loud and may cause video interference. Later models have a quieter, noninterfering propeller fan.

There are two versions of the SE logic board. The early model (part number 820-0176) doesn't work as well with expansion cards and SIMMs as the later one (part number 820-0250). Unfortunately, to tell which model you've got,

you have to remove the logic board and read the label printed to the right of the 68000 chip.

Mac IIs and IIx's. Lift the lid and read the part number stenciled on the left rear corner of the logic board. Later models (part number 820-0288) are almost 25% faster than earlier models (part number 820-0163).

You'll find the later model boards in Mac IIx's too. Their batteries (beneath the hard drive area) either snap in or are soldered in. Snap-ins are much easier to replace.

cx's and ci's. The GE power supply is more reliable than the Astec. To find out which you have, lift the lid and read the label.

The ci has limited 8-bit video built into the logic board, so it may not come with a video card. The ci's built-in video works fine with Apple monitors, but it doesn't support NTSC and PAL video equipment.

Upgrading your Mac

upgrade basics *(SM/AN/SA/Mac Kenny)*

You can't turn a sow's ear into a silk purse, but you can turn a cx into a Quadra, and you can upgrade many other Mac models as well, by enhancing the amount of RAM, the ROM, the processor chip, the clock speed, the floppy drive, the hard drive and various combinations thereof. (RAM upgrades are covered in Chapter 3.)

Upgrade kits are widely available, both from Apple and other vendors, but remember that upgrading isn't always cost-effective. It may make more sense to sell your old machine and put the money toward a new one.

Upgrading from Pluses and SE's is covered in detail a few entries down. Here are a few other common upgrades:

From a Classic to a Classic II. This $700 upgrade gives you a different logic board and includes two megs of RAM, a microphone and a new case—the actual outside of the Mac, that is, not a carrying case. But you don't get a hard drive, and you need one to run System 7.

From a IIx or cx to a ci. Accelerator cards (described in the next entry) can make a IIx or cx perform like a ci. And for $1500, you can actually turn a cx into a ci, by replacing its logic board (although to upgrade the II, you'll also have to install a high-density drive). The dealer gets a credit from Apple for your old board, and thus might be open to some bargaining.

From a II or IIx to an fx. For $2600, you can turn a II or IIx into an fx, by replacing the logic board. (You can't upgrade from a cx or ci to an fx, because the cases aren't the same size.) Here again, you may be able to bargain with the dealer on the board swap.

From a cx or ci to a Quadra 700. For $3500, you get a Quadra 700 logic board, four megs of RAM, a microphone and a new case, but you keep your old drives and power supply. (The reason the Quadra has so few expansion slots is apparently because Apple wanted to make it possible for the older power supplies of the cx and ci to handle them.)

accelerator cards *(PH/Larry Pina)*

One easy way to upgrade a Mac is to install an *accelerator card* in it. This gives you a more powerful processor chip and/or a faster clock rate, and sometimes extra memory as well.

The increased speed an accelerator card provides is especially important when you plan to use an external monitor. As the size of a screen increases, so does the time it takes to redraw it. Most monitors have extra memory on their video cards to take care of this problem, but even so, an accelerator card usually speeds things up.

Some accelerators have sockets for math coprocessor chips. These won't do much for you unless you work with complex formulas, large spreadsheets, high-resolution graphics or 3D rendering. If you're not absolutely sure that you need a math coprocessor, you probably don't.

There are many different kinds of accelerators; they vary depending on which model of Mac you have and how fast you want it to run. Some accelerators make modifications to your Mac's motherboard, but on newer Macs, they tend to plug into the PDS or a NuBus slot (PDS cards tend to be faster).

New accelerator cards appear all the time. The Mac magazines run review round-ups of them at least once a year, and a local user group can tell you which cards are currently preferred by their members.

When shopping, find out which processors the cards you're comparing use. Since most cards with the same type of chip have approximately the same speed, you can then pick a card based on price and the manufacturer's track record.

accelerators and interleave ratios *(SA)*

Different models of the Mac need different *interleave ratios* in order to access their hard disks as quickly as possible (this is explained in Chapter 3). If you boost your Mac's performance with an accelerator, ask the manufacturer what interleave ratio you should use, to take advantage of your souped-up Mac's new speed.

upgrading a Plus or SE *(RS)*

A company called Brainstorm sells an accelerator that makes graphic operations on a Plus or SE an average of three times faster, and hard drive transfers an average of twice as fast. It lists for only $250, *including* installation. And you don't need to buy any other expensive add-ons like fans,

power supplies or special RAM. This is an incredible bargain—*much* less expensive than other accelerators.

The Killy-clip used with other accelerators tends to need constant fiddling to maintain a good connection, but this accelerator is soldered in (it's only about the size of your thumb). The only thing that it doesn't give you is virtual memory under System 7. But that's not such a bad thing. The slowdown caused by using virtual memory has prompted many users to buy more RAM instead.

The PowerBooks have spawned a technology that lets you connect a full-page display to your SCSI port, instead of having to open up the Mac and attach a video card to the Plus's motherboard. (SCSI is discussed in Chapter 3.) Sigma Designs' 15" full-page SCSI monitor ($1000 list) includes acceleration to increase the speed of graphics display and text scrolling. It will work anywhere in a SCSI chain, making it much more convenient than other SCSI monitors that must be at the end of the chain (thus competing with other peripherals that also must be at the end of the chain, like some scanners).

If you need to read and write 1.4MB floppies (and 1.4 MB or 720K MS DOS floppies), get Applied Engineering's AEHD Plus Drive. It's fully SuperDrive-compatible, plugs directly into your Mac's external floppy drive port and requires no chip upgrades. It lists for about $450, but I've seen it as low as $230.

Mac hardware tips

the opening chord *(AN/JK/Alan Winslow)*

When you turn a modular Mac on—by pushing the ⌧ key at the top of the keyboard—it strikes a chord. (It's closest to a C chord with a suspended fourth or a second-inversion F chord.) This chord tells you that all is right with the machine—or at least that certain basic things are right.

If something's wrong, the notes sound separately rather than together. This arpeggio means one of your memory chips is bad or—more usually—that a SIMM is simply not seated firmly in its socket. At worst it means you'll have to replace the motherboard of your computer.

Apple actually trains service personnel to be able to recognize what's wrong with your computer by which particular arpeggio it plays on startup.

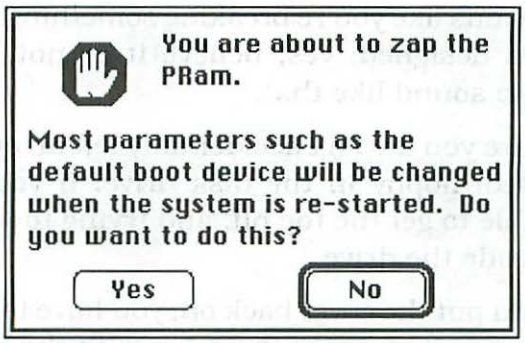
zapping the PRAM *(SA/SM/LA/AN/Mac Kenny)*

A Mac's battery provides power to a special area of memory called *parameter RAM*, or *PRAM* (often pronounced *pram*, but *PEE-ram* is correct). In addition to keeping track of the date, time and various control panel settings, parameter RAM also remembers what's connected to the printer and modem ports on the back of the Mac.

If the information in parameter RAM becomes corrupted, you can reset it to the original defaults, by zapping the PRAM. Under System 7, you hold down the Shift Option P R keys simultaneously and select *Restart* from the Special menu (it's acceptable to use your tongue to achieve this feat). There's no alert; everything happens invisibly.

If your tongue isn't up to the job, Shut Down and turn the Mac back on using the power-on key (⏻) key at the top of the keyboard while holding down Shift Option P R (press Shift Option R with your left hand, press P with your right thumb and hit ⏻ with your right index finger.) You won't see an alert here either, but the Mac will seem to get stuck in startup. You'll hear the opening chime and the sound of your disk being accessed, and then you'll hear the chime again. At that point you can release the Shift Option P R keys.

Under earlier system software, you open the menu and select *Control Panel* while holding down Shift Option ⌘. You'll get a dialog box that looks like the one at the top of the next page:



Click *Yes*.

On the Plus and earlier models, you can also zap the PRAM by removing the battery for ten minutes.

Zapping the PRAM returns all the control panel settings (sound volume and type, rate of insertion point blinking, etc.) to their defaults, so you'll have some resetting to do. Conveniently, though, it doesn't change the time or date.

opening a Mac's case *(AN/SA/SM/Mac Kenny/JK)*

To get to the expansion slots on modular Macs, you have to open the case. They come in five basic kinds: the Quadra 950 and 900's tower, which is meant to stand on its side; the si's small, one-slotted box; the LC's small, one-slotted (but different) box; the three-slotted box of the Quadra 700, ci and cx; and the still-larger six-slotted box of the fx, IIx and II.

On all the boxes, you have to begin by removing a single screw at the center back of the case. (If you like, you can just leave the screw out of the back altogether, so you don't have to worry about finding a screwdriver every time you want to open the case.)

On the six-slotted case of the fx, IIx and II, you then have to push in the two latches on either side of the top (at the back) and tilt the cover forward. A hideous cracking noise ensues (except on the fx, which has an improved

case). It sounds like you're breaking something, but that's how it was designed; yes, believe it or not, it's really *supposed* to sound like that.

Make sure you haven't accidentally left an ejected (but not removed) floppy in the disk drive. If you did, you won't be able to get the top off, and trying to will pry the disk up inside the drive.

When you put the cover back on, you have to take some care to line up the front of the cover with the front of the case. After a while you'll see what goes where, but it's not terribly obvious. Sometimes the cover catches in the back but not the front; when that happens you can usually just push down on the front and snap it into place (even after you've reattached the little screw in the back).

The other modular cases have different—and more convenient—latches at the back. You're spared the terrible cracking sound, but the procedure is about the same.

Opening a compact Mac's case requires special tools and techniques, and we don't recommend it. For one thing, opening the case voids your warranty with Apple. (And they can tell if you've done it too.) For another thing, the Mac contains capacitors that can hold high voltage for 30–60 minutes after you turn the Mac off. And it's quite easy to break the picture tube—a quick way to burn $150 or so.

We used to tell people how to open a compact's case, but then we realized that if you know the dangers, you probably also know how to open the case (or can easily find out from a friend). If you *don't* know the dangers, you shouldn't be messing around in there; have a technician do it for you.

As with compact Macs, opening PowerBooks also voids the warranty, but it's less dangerous than opening a compact Mac.

the programmer's switch *(AN/SA/SM/LA/Mac Kenny)*

mostly for beginners

The *programmer's switch* is that little piece of plastic you didn't know what to do with when you got your Mac (unless you bought an si, LC, PowerBook or Quadra). Despite its name, it's not just for programmers—it's for anyone whose Mac crashes occasionally (and that's all of us).

You don't have to open the case to install the programmer's switch on a compact Mac; just snap it into place in the rearmost vents on the *left* side, with the loose end of the buttons facing *down*. You don't have to open the case on the Mac II, IIx and fx either; the switch snaps into the rearmost vents on the *right* side of the case, with the loose ends of the buttons facing *up*.

On the ci and cx, you do have to open the case. The switch goes on the front of the machine, on the left side (the pictures in the manual make the procedure very clear). On the Quadras, the programmer's switch is built into the faceplate of the cabinet.

very bad feature

Putting the switch on the front of the machine isn't a great idea, because it's much more likely to get accidentally hit by a book or something than when it's on the side. There's less danger of this with a Quadra that you stand on its side, since the switch is then higher up. To make it even harder to accidentally push them, the Quadra's buttons are recessed into bezels.

If your Mac has to stay in a place where curious or careless people could accidentally press it while you work, consider not installing it (assuming you have that choice).

The programmer's switch actually consists of two buttons—*reset* and *interrupt*. On some Macs, each of the buttons is labelled; on others, they're marked by symbols (a left-facing arrow for reset, a circle for interrupt). In any case, when the switch is on the side of the Mac, the reset button is the one nearer the front of the machine; when

the switch is on the front of the machine, the reset button is on the left.

If your Mac crashes (and doesn't give you a dialog box with a *Restart* button), don't switch the power off and on again—press the reset button instead. (System 7 sometimes also lets you escape from a frozen application with Option Cmd Esc.) Either way you avoid the electrical power surge the Mac experiences each time you switch it on. (The interrupt button is pretty much just for programmers.)

The si and the LCs don't have programmer's switches; you restart them by holding down ⌘ Control and hitting the ◁ key (the one at the top of the keyboard you use to start up the Mac). To get the interrupt switch, hit ⌘ ◁.

The PowerBook 100 has buttons on its left side. The 140 and 170 have two little holes on the back panel (all the way to the right as you face the panel); they're marked with the usual triangle and circle. You push something like a straightened paper clip into them.

fans *(SA/AN)*

The fans on modular Macs are well-made, and put out something fairly close to *white noise* (sounds at all frequencies). To keep the volume as low as possible, make sure there's enough space around the vents. If there isn't, the Mac will heat up and the temperature-controlled fan will work harder.

Also, if you don't need to use all the expansion slots (and who does?), skip the one closest to the power supply. The heat generated by a card in that slot can also make the fan run faster.

don't double-up on disks *(AN)*

It's a lot less obvious when there's a disk in a modular Mac's floppy drive than it is on a compact Mac. Several times I've tried to stick a second disk in and once or twice

I've actually succeeded (the second disk slides in over the first at an angle).

I've always been able to get the second disk out, but this can't be good for the drive (to say the least), so pay special attention to whether a drive slot is occupied before you blithely shove a disk into it.

replacing the battery *(SA/SM/ND/AN/Mac Kenny)*

You'll know the battery in your Mac needs to be replaced if you starting losing control panel settings (like the time and date) whenever you shut off the machine. A Mac will work even with a dead battery, but you'll get tired of resetting your control panel preferences.

Most modular Macs (including the Quadras, use snap-in lithium batteries, Apple part number 742-0011, which are supposed to last seven years. If they fail, you can replace them yourself. In SE's, Mac IIs and IIx's, the special lithium battery is soldered to the main board and can only be replaced by a dealer. (The II and the IIx have *two* batteries soldered in. These batteries are also supposed to have a seven-year life, but some repair services replaced dead batteries in Mac IIs that were barely three years old.)

The PowerBook 100 uses three snap-in lithium batteries, Sony CR2430, Duracell DL2430 or the equivalent. These are standard batteries and should be easy to find. The PowerBook 140 and 170 use a single backup battery which is soldered into place and must be replaced by an Apple dealer. In both cases, these backup batteries should last several years before needing replacement.

On the Plus and earlier Macs, you just remove the battery cover, snap out the old battery and snap in the new. Although it's the same size as an ordinary AA battery, it's actually a 4.5-volt alkaline, Eveready 523 or equivalent.

✎ *stuck pixels on PowerBook 170 screens* (DH/ND/SM)

A certain percentage of PowerBook 170 screens are shipped with a few "pixel voids"—dots on the screen that are doomed to remain white forever. *[And believe me, that's a scary feeling.—AN]* These stuck pixels can be a considerable annoyance, particularly when they're close to one another. (Apple knows about this problem but says that purchasing "zero-defect" screens would cost so much more that no one would want to buy the computer.)

The moral is, before you buy a PowerBook 170, check its screen carefully. Apple considers screens defective if they have more than five pixels that are stuck white, or two that are stuck white less than an inch apart, or a single pixel that's stuck black. If you get a screen like that, you ought to be able to get your dealer to exchange it for one that meets the standard.

But it's still better to find a machine with *no* bad pixels and buy that instead. If you're stuck with a machine that has five or fewer defective pixels, try changing the desktop pattern to make them less painfully obvious.

✎ *buggy PowerBook floppy drives* (DH/SM)

Many owners report finicky internal floppy drives on the 140 and 170 that reject disks—particularly mass-copied ones—which regular desktop Macs can read just fine. The problem has been partially fixed on later models, and revised disk drives are available free under the PowerBook's one-year warranty. (The external floppy drive on the PowerBook 100 doesn't seem to have this problem.)

✎ *PowerBook backlights* (DH)

The backlights on the PowerBook screens are designed to last several years, but as they age, they get dimmer. Keeping the light as low as possible should extend the backlight's life, and will also extend the life of the battery.

PowerBook 100 hard drive and cable (SM)

Reader Vern Clinton reports that when he renamed the drive in his PowerBook 100, it would freeze as soon as he tried to transfer data onto or off of it (despite the fact that it still mounted without trouble). Changing the name back to *Macintosh HD* solved the problem. (This apparently has to do with the fact that you can *dock* the 100 into a desktop Mac, as described in the PowerBook entry above.)

Vern also recommends sticking to Apple's SCSI cable; a third-party SCSI cable gave him problems that disappeared when he went back to Apple's.

the PowerBook battery case (SM)

It's important to use the free case Apple provides for the PowerBook's replaceable battery packs, because the batteries are prone to accidental shorting when they come in contact with metal objects like keys or paper clips. A short could cause a fire or burns, and it's also likely to damage the battery, which costs $100. If you bought an early PowerBook that didn't come with one of these cases, you can request a free one by calling this toll-free Apple number—800 377 4127.

preventing Mac Plus failures (Rich Wolfson)

Early Pluses were notorious for their failing power supplies. One way to prevent the power supply from overheating is to make sure the voltage is set to exactly five volts. Have a technician open the case and use a volt meter to check the voltage between pins 1 and 2 of the mouse port. Using a plastic screwdriver or a TV alignment tool, adjust the potentiometer at the side of the machine to five volts. The voltage changes as the unit heats up, so leave it on for five to ten minutes and check that it's still at five volts.

Most Pluses come set to anywhere from 4.8 to 5.1 volts, despite Apple's recommendation that they be set to exactly 5.0. In a computer lab with more than a dozen Pluses,

there wasn't one that was set to the correct voltage. We had one power supply problem early on, but none after we set the voltages correctly.

If the power supply in a Plus fails, you don't have to replace the whole thing—it's almost always just the flyback transformer and its related parts that are causing the problem. One company that sells flyback-transformer parts kits is Soft Solutions. Their prices and service are good, their tech support is great and their parts are heavy-duty—exceeding the Mac's minimum requirements.

Another way to avoid potential problems in a Mac Plus is to install a fan to keep it from overheating. A piezoelectric fan is small, inexpensive and makes very little noise.

keeping the Portable's battery charged

(AN/Todd Corleto)

If the Mac Portable's batteries fall below 5.4 volts, they can't be recharged. So don't leave a battery in the Portable for more than two weeks without plugging the Portable's power adaptor into a wall socket. (The safest thing is simply to leave the Portable plugged in whenever you can.)

Unfortunately, the plug on the Portable's power adaptor is one of those stupid round jobbies that falls out all the time. God only knows why Apple's designers continue to use them, but since they do, pay attention to it and make sure it doesn't accidentally disconnect.

To store a Portable battery, recharge it and put it in a cool, dry place; make sure you recharge it every six months at least. Don't store it for extended periods in a battery recharger that isn't plugged into a power source, since doing that will slowly drain its power.

opening up the Portable *(AN)*

If you're not careful to fully release both catches when opening the Portable's screen, you can unintentionally lift

up the whole computer in the process, only to drop the bottom part of it back down on the table with a resounding crash when the screen finally opens. (An adroit, graceful person like myself would never do anything like this. No way. But you may not be as agile as I am, so read on.)

To open the Portable, push in *firmly* with your thumbs at the *ends* of the handle to release the catches. Then lift the screen from either side with your fingers, making sure you're not also lifting the bottom part of the computer. The hinge on the Portable's screen is quite stiff, so it may take you a while to get used to the amount of effort required, which is more than you expect (although well within the capabilities of most world-class triathletes).

lighting the Portable's screen *(AN)*

The Portable's screen is crisp and clear in bright light, but hard to see in dim light. So you need adequate task lighting—which is something you should have anyway.

In order not to be victimized by 40-watt bulbs in hotel rooms (usually installed in 300-lb table lamps placed in the least convenient place in the room), I used to carry a small fluorescent table lamp and an extension cord with me when I travelled with my Portable. The lamp weighed less than a pound (trivial compared to the weight of the Portable itself) and it lit up the screen like a movie marquee, with plenty of light left over for my notes.

I set the lamp up on a box on the back of the Mac, so that the gooseneck extended the fluorescent tube over the screen (but several inches above it) and the light shone directly down on the screen. It sounds horrible but it worked pretty well. The only problem was finding a box or something to use to get the lamp high enough over the screen. (Now, of course, you can buy a customized Portable with a backlit screen—or a PowerBook, which comes with one.)

Monitors

bit-mapping and QuickDraw (AN)

One of the Mac's greatest features, and one that Mac users tend to take for granted, is how quickly all the graphic elements on its screen can be manipulated—created, redrawn, moved around. For example, windows can be shrunk, stretched, squeezed, overlapped and moved around with amazing rapidity, especially given how much detail there is in them.

This is possible because the screens Macs use are *bit-mapped*—that is, for every little dot on the screen (called a *pixel)* there's a little switch in memory that controls it. Since you can control the screen directly, you can change it quickly.

But it takes more than hardware to get a screen image as responsive and fast as the Mac's. Software is the key, and the software in this case is QuickDraw, which is built into the Mac's ROM. Developed by Apple programming genius Bill Atkinson (who also developed HyperCard), QuickDraw is certainly a milestone in the history of personal computers. It makes your life more pleasant every time you touch the mouse.

black-on-gray (AN)

There's one problem with showing black text on a white background, the way the Mac does—the large white area on the screen increases the amount of flicker (see the next entry for more on this) and that makes it harder to look at the screen for a long time. This is particularly troublesome on large monitors, where it would be a relief to be able to switch to white-on-black, at least some of the time.

One thing you can and should do to make the screen easier on your eyes is turn the brightness down. A bright white background is very hard to look at—you want black

on *gray*, not black on white. Most people keep their computer screens too bright, which puts a real strain on their eyes.

Keep the light in your room dim. If daylight does seep in, or if there are lights you can't turn off, turn the brightness on the screen up to compensate. But a dimly lit room and a black-on-gray screen are ideal.

(Avoiding reflections on the screen is also important. For more on that, and other ergonomic considerations, see the section at the end of this chapter called *Protecting yourself.)*

✎ *the refresh rate* (AN)

mostly for beginners

One of the most important characteristics in a monitor is its *refresh rate*—how often it redraws the image on its screen. The refresh rate is measured in *hertz* (times per second)—abbreviated *Hz.*

If the refresh rate is too slow, you get *flicker* (also called *strobe).* Regular house current alternates at 60 Hz (here in the US); if you can see the flicker in fluorescent lights, a refresh rate of 60 Hz is probably too slow for you. 60 Hz is the refresh rate on compact Macs, but because the screen is only 9", most people find it acceptable. (The larger the screen, the more flicker is likely to bother you. Some companies go up to 72 Hz, 87 Hz and beyond on larger monitors.)

Peripheral vision is particularly sensitive to flicker, so if you're in doubt about a screen, turn away from it and see how it looks out of the side of your eye. Another good way to accentuate flicker is to wave your hand in front of the screen.

✎ *black-&-white, gray-scale & color* (AN/SA/SM/Mac Kenny)

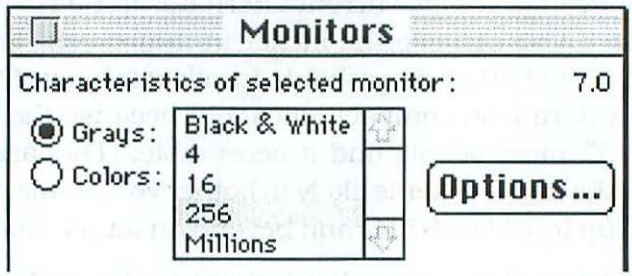
mostly for beginners

The built-in monitors in compact Macs are black-and-white. What looks like gray—the standard desktop pattern, for example—is actually made up of alternating black and white dots.

On a *gray-scale* monitor, however, each dot can be black, white or a shade of gray. (How many shades of gray depends on the video card.) With real grays available, screen images can be of photographic quality. (Of course the grays on a gray-scale monitor are *also* composed of black and white dots, but the dots are much smaller.) Both black-and-white and gray-scale monitors are lumped together under the term *monochrome*, which means *one color.*

On *color* monitors, each pixel on the screen is composed of three tiny dots of color—red, green and blue. Your eyes merge them into a single, colored dot.

If you have a color monitor, you also have a gray-scale monitor. To turn it into one, go to the Monitors control panel and click the *Grays* button (instead of *Colors).* Then choose a number from the list box (only the ones your video card can handle will show up). These numbers now represent shades of gray, not colors.



Scrolling (and other forms of screen response) take significantly longer on a color monitor than on a black-and-white monitor of the same size, and gray-scale slows things down just as much (assuming you have the same number of colors and/or grays selected). To speed things up, choose *Black & White* in the list box.

video cards *(SA/SM/AN/Mac Kenny)*

mostly for beginners

The si, ci, LCs and Quadras all have varying degrees of video support on-board—that is, they can run external monitors without any additional hardware (except for the

monitor itself, of course). To run an external monitor on other Macs, you need a *video card* that plugs into a slot on your Mac.

The more information there will be on the screen, the more memory you need on the video card. On a monochrome monitor, every pixel is controlled by one bit of memory (a bit can either be a zero or a one, and thus can represent either a black or a white dot). If you allow two bits of memory per pixel, you can have any of four colors (or shades of gray) per dot, because two bits can represent four different numbers (00, 01, 10 and 11, in the binary notation computers use).

You don't see two-bit color on the Mac much, but there is *four-bit color*—four bits of memory per pixel, which can represent sixteen different colors. *Eight-bit color*—eight bits of memory per pixel—lets you display 256 colors on the screen. Even that's not enough for some purposes. For photographic-quality color, you need *24-bit color*, which lets you display more than sixteen million colors *at one time* (or as many of them as will fit on the screen).

monochrome or color? *(AN)*

It's a nice idea to do both color and black-and-white work on a single monitor, but you'll almost certainly regret it if you try. The quality of the text on color monitors simply isn't good enough for extended word processing or for the other kinds of tasks computer users spend most of their time with—spreadsheets, databases, black-and-white layout and graphics, etc. (As mentioned above, color also slows down scrolling.)

If you really need color—or, since most people don't really *need* color, if you really *want* it—and you also work extensively with text, you either need to get two monitors (make the one you use less smaller) or use workarounds like assigning colors to parts of a document on a monochrome screen and then proofing them in color printouts at a

service bureau. (Or you can do all your work on a color monitor and just have a drink every time you need to work on a black-and-white file. It won't make the image any sharper—just the opposite—but you won't care.)

Since monochrome monitors make the most sense for most people, we'll cover them first, then color monitors.

black-and-white or gray-scale? (AN)

A gray-scale video card costs as much as a color one; in fact, they're usually the same card (you only save on the monitor). And yet, unless you're editing photographs in Photoshop or doing some other high-end graphics task, few users need gray-scale capabilities. (I had a gray-scale card for years, thinking I would need gray-scale for something, but I never once turned it on.) Gray-scale does make for a sexier-looking screen but, as with color, it slows down scrolling.

Since most people don't need gray-scale capabilities, we tend to ignore them when discussing monitors below.

evaluating monitors (AN)

Back when I'd only used compact Macs, I never thought their 9" screen was too small. I loved its crisp, readable image and recognized that *resolution*—the number of pixels, or dots, per square inch—was just as important as the physical size of the screen. (To realize that, all you need to do is walk up close to one of those monster projection TVs that fill the room and watch the snarling, boiling lines wrestle each other. It's a real 20th-century nightmare image.)

Still, it was annoying only to be able to see about a third of a standard 8½ x 11 page at a time, especially when trying to lay out two-page spreads for earlier editions of this book. So I got a black-and-white two-page display.

After about a day, I could no longer work on a compact Mac without having to constantly repress the urge to

grab the edges of the screen and try to pull them farther apart. After a week, I couldn't look at a compact Mac without feeling there was something *wrong* with it: *How come the pixels are so big? How come there's so little information on the screen?* I don't think I've ever been more quickly spoiled by anything in my life.

External monitors are required with modular Macs, and you can also buy them for compact Macs and PowerBooks. But if you get one, remember—there's no turning back.

Your first consideration when buying a big screen is which shape you prefer. The basic distinction is between tall and wide screens—or *portrait* and *landscape*, as they're often called.

The wide screens are better for layout work involving facing pages and for graphics, design and engineering work in general; they're also good for large spreadsheets, and for running several applications at a time. If you primarily do word processing, or lay out single pages, a tall screen will be more economical.

The next consideration is how much data you want to display. Like TVs, the size of monitors is given in diagonal inches—the distance from one corner of the tube to another. Unfortunately, the actual size is often smaller than the advertised size. For example, my 15" NEC color monitor measures 14" corner to corner. (On the other hand, my 19" Radius monitor measures a full 19".)

What's more, computer monitors always leave a black border around the image they display; it can be half an inch wide or more. So you need to measure the size of the *image area*, not the size of the screen.

But even the correct diagonal measurement of the image area won't tell you what you want to know about a screen's capacity, because they have different *resolutions*—the size of the pixels varies from monitor to monitor.

mostly for beginners

Compact Macs' 9" screens display 512 pixels across by 342 down, at 72 dpi. Simple division tells you that they'll display an image 7.1 inches wide and 4.8 inches high. Just think of it as 7 x 5. (4.8 inches is actually 44% of an 11-inch page, not a third, as I said above. But by the time you allow for the menu bar, the horizontal scroll bar and so on, it takes just about three screenfuls to display a page.)

What size a compact Mac's 7 x 5 screen image actually ends up being on paper is a complex matter and depends both on what software and what printer you're using. But, in general, the screen image corresponds fairly closely in both size and shape to the printed copy.

One measure of a screen's capacity is the total number of pixels it displays. A compact Mac's screen has just over 178,000 (342 x 512). Some monitors can display up to two million pixels—more than fourteen times as much as a compact Mac—although they usually display information at more dots per inch than 72.

(72 dpi was chosen because type has always been measured in *points*, and there are 72 points to the inch. This makes some sense, but I think 72 dpi is too coarse. Once you get used to finer resolutions, 72 dpi looks ridiculously big and clunky.)

very hot tip

A good way to compare monitors is by pixels per dollar. Just multiply the number of pixels across by the number of pixels down, then divide the price of the monitor into that. The bigger the resulting number, the better (everything else being equal—which, of course, it seldom is).

Pixels per dollar can vary quite widely. But this measure should only be the beginning of your comparison—especially since some monitors give you a choice of resolutions. For example, my NEC color monitor will display 640 x 480, 800 x 600 or 1024 x 768, at various refresh rates, depending on what video card it's hooked up to.

Monitors are a lot like speakers—you can look at technical specs all day long, but the only way to buy speakers is to listen to them, and the only way to buy monitors is to look at them, ideally side-by-side.

very hot tip

What you're looking for is a crisp, high-contrast, rock-solid image—one that isn't washed-out, doesn't waver or flicker, and isn't distorted around the edges. Getting that is more important than any other consideration, and worth paying more for. (For more things to look for, see the entry called *evaluating color monitors* below. Many of its criteria apply to monochrome monitors as well.)

Remember—you're going to be staring at the screen for *thousands* of hours, and anything less than a great image will really drive you nuts. Skimping on the quality of your monitor is like buying an uncomfortable bed—whatever you save won't be worth it in the long run.

Apple's 12-inch monitor *(JK/AN)*

If you don't need a full-page screen, Apple's 12" monochrome monitor is great. Few large ones can match its brightness, sharpness and clarity. It sits comfortably on top of the LC or any of the Mac IIs, needs no video card (if your Mac has a video port) and can display up to 256 shades of gray.

very good feature

It doesn't give you a lot of pixels—just 640 x 480, not even twice as many as on the compact Mac's 9" screen. But based on the current list price of $300, you get 1024 pixels per dollar. That's terrific, but if you do have to buy the video card for your Mac (Apple's cheaper one lists for $700), you only get 307 pixels per dollar, and we don't recommend doing that for such a small monitor.

bargain

Apple Portrait Display *(SM)*

This monitor comes the closest I've seen to the crisp, bright image you get on the compact Mac's 9" screen. It displays 640 by 870 pixels (for a total of about 557,000

very good feature

total pixels—three times what you get on a compact Mac) in an 8" x 10.8" work area (the resolution is 80 dpi).

The monitor lists for $1100, which means you're getting 506 pixels per dollar if you have an si, ci, LC or Quadra and can plug it into the video port. If you have another kind of Mac, you have to buy a video card. The basic black-and-white one lists for $700, which drops the pixels per dollar down to 309. The monitor will also support a gray-scale card.

This screen is very flat and the image is crystal-clear and rich with contrast. It's really a pleasure to look at every day.

✒ *Radius Pivot* (AN)

Radius makes a very slick single-page display that *pivots* from horizontal to vertical to accommodate different tasks. When you move from, say, a letter to a spreadsheet, you just tip the monitor over onto its side. It takes just a moment for the image to reform in the new configuration.

Called, logically enough, the Pivot, it currently lists for $1150 with a video card. There's also a color pivot, which is described below.

✒ *two-page monochrome displays* (AN)

Since I wanted to get this edition out without going blind (going nuts is bad enough), I spent some time trying to find the best possible monitor to write it on. I was helped by an excellent survey in *Macworld* that rated monochrome monitors in many ways, including *contrast ratio*, which is how brightly white squares are displayed on the screen compared to black squares.

The higher the contrast ratio, the less washed-out the screen will look, and the sharper the image. The overall champ was Cutting Edge's 15" gray-scale one-page display (640 x 870 pixels, at 80 dpi) It had a ratio of 7.7, and was followed by Apple's 12" monitor (described above), with

a ratio of 7.5. I need a two-page display, however, and the two leaders there, both with ratios of 6.7, were the RasterOps 19" and SuperMac's 21" Platinum (oddly, the differences between 19" and 21" monitors of the same brand tended to be at least as dramatic as those between different brands).

I liked the RasterOps 19", except for two things. It only displays 1024 x 768 pixels (a total of about 786,000 pixels) at 72 dpi, and that's not enough to show full pages top to bottom—except in programs, like Quark, that let you reduce the size of the view. This was particularly annoying in Excel, which has three bands of information at the top of the screen and one at the bottom, none of them removable. There's also no way to view a spreadsheet at other than full size, so I had to constantly scroll around to see different parts of the page.

The RasterOps' display is also quite blue, although I suppose this is something you'd get used to (I was viewing it next to other monitors). Their manual doesn't even mention the brightness and contrast controls, which seems to me a rather major omission.

Susan McCallister has a 19" RasterOps and is very happy with it but, unfortunately, this model has been discontinued. (It's amazing how frequently monitor models go out of production. There was a SuperMac 19" that I wanted to look at, but it was also discontinued.) If you can still find a RasterOps around, it should list for $1400 with a black-and-white card, which comes to 562 pixels per dollar.

Like the Radius 19" that I'd been using for years (until it faded), the 21" SuperMac displays 1152 x 870 pixels (at 77 dpi); this is just over a million pixels total—5.8 times the compact Mac screen's—and, unlike the 19" RasterOps's 1024 x 768, adequate for viewing two full 8 ½ x 11 pages at full size. It lists for $1500 with a black-and-white card, giving it a pixels per dollar score of 668.

As mentioned above, this monitor has good contrast. Its refresh rate—75 Hz—is great and, like all SuperMac monitors, it comes with a three-year warranty. Unlike any of the other monitors I looked at, it has a decent stand; you can actually get it to tilt without leaning on it or pounding on it with your fist. (I guess the other manufacturers figure no one's going to buy or not buy a monitor based on its *stand*, so they skimp on them.)

But the image on the 21" SuperMac's screen was *blurry*. This was quite dramatic—both Susan and John Kadyk, who also looked at the monitors, remarked on it immediately—and it occurred on both monitors SuperMac sent me (the first had been slightly damaged in shipping). I don't know if it's the antiglare coating or what, but I found this monitor simply too blurry to use.

Then I tried Sigma Design's 21" SilverView monitor. *Macworld* tested its contrast ratio at 5.7 (good but not the best) but its distortion was zero. (Distortion measures whether squares look square or like parallelograms, and whether circles are circular or oval. The only other monitor with zero distortion was the SuperMac 21".)

I like the SilverView a lot, and it's what I'm using as I type these very words. It was designed for desktop-publishing work and has a very flat, colorless screen (no bluish or yellowish cast to it). The display area is 12" high by 16" wide, big enough to show 1152 x 870 pixels at 72 dpi (to squeeze the same number of pixels onto my 19" Radius's 10.75" by 14" display area, resolution had to be 82 dpi).

The SilverView comes with some useful software that, among other things, lets you make the pointer bigger, which is *very* helpful on large screens. Current list price with a black-and-white video card is $1660, giving you about 604 pixels per dollar. A grayscale card is also available ($180 more), as is a $200 optional coating that reduces glare and static.

Beth Gerber has also used the SilverView, as well as another Sigma monitor, the L-View Multi-Mode; her review of them is below. (One weird little wrinkle: when you install the SilverView, you have to open and close the Monitors control panel—you don't have to change anything, just open and close it—to get the monitor to work.) The SilverView also comes in a portrait mode, with the same number of pixels and the same size screen.

Two other two-page displays *Macworld* liked that I didn't get a chance to look at were CalComp's 21" Drawing Card and Radius' 21" Two-Page Display. I'll try to get evaluation units of them and compare them to the SilverView in an update.

We've had quite a few reliability problems with the Radius 19" displays we have at G&B. But the Radius software is pretty slick. You get menus that tear off in all applications (but not, so far, under System 7), a built-in screen saver, screen dumps you can crop, and menus in larger-than-normal type.

(This last feature is the only one I don't use. After all, it's the absolute size of the type that matters for readability, not what portion of the screen it occupies. So I don't see the point of large-font menus, regardless of what size screen you have.)

Another line of monitors we've used are Mobius. The screen quality isn't the best but they're incredibly inexpensive—including video cards, they're only $600 for a one-page display (928 pixels per dollar) and $800 for a two-page display (983 pixels per dollar), so if you're on a budget, they're definitely worth checking out. Mobius promises a free 48-hour replacement on monitors returned for warranty repairs.

The company is named after the German mathematician August Möbius (1790–1868) whose one-sided surface, the *Möbius strip*, gives us the symbol for infinity (∞).

Failing, for some unaccountable reason, to follow in the gold-paved footsteps of Mötley Crüe, the company neglects to use the umlaut (¨) in its name—even though, unlike Mötley Crüe, it has every right to it.

For more reviews of two-page monochrome monitors, see the next two entries.

Mirror monitor *(SM)*

Since Mirror only sells direct to the public, their prices don't include dealer markups. They make scanners, hard drives and other storage devices, and a good-looking 19" monitor that sells for a great price—$800, including the black-and-white video card. For that you get 1024 by 768 pixels (786,000 total), which gives you 983 pixels per dollar.

The monitor isn't perfect by any means. With its 72-dpi resolution, you get a display area that's only about 10.5" high by 14" wide; the screen's not flat, so lines that are supposed to be straight tend to look a little bowed. But aside from this, there's surprisingly little distortion.

The Mirror monitor only has a brightness control (you can't adjust the contrast) and it only covers a small range, from bright to somewhat dim. But the image is very sharp and *very* stable, thanks to a refresh rate of 79 Hz (one of the highest you can find).

The monitor meets the Swedish ELF and VLF emissions standards, and it's thoughtfully designed in other ways as well. Mirror has put three ADB ports in its base, so you can connect your keyboard and mouse to it and get your computer off your desk. You even get an ADB extension cable. This is very user-friendly thinking.

Sigma monitors *(Beth Gerber)*

I've used Sigma Designs' 21" SilverView monitor for several months at my home office; at work, I use a 19" Radius

Two Page Display. The SilverView is noticeably crisper, and I find the contrast much sharper.

The refresh rate is a respectable 73 Hz, and the resolution is 72 dpi. (The new SilverView Pro has a 75 Hz refresh rate.) I like the larger, actual-size type, although you do see more jaggies at that size (the Radius is 82 dpi), so it's a trade-off.

The monitor complies with the Swedish ELF low-emission guidelines. It comes with a tilt-swivel base, but mine was quite stiff and needed to be pushed around some before I could get it to move up and down. Getting through on the customer support line has been fairly easy, and the three tech people I spoke with were knowledgeable and helpful.

A couple of my colleagues feel that the SilverView's screen is yellowish compared to the Radius', but I find the Radius gray and dingy compared to the SilverView. My only complaint about this otherwise excellent monitor is that the screen isn't flat enough, so there's annoying distortion of the image along the top and bottom edges.

Sigma also makes the 19" L-View Multi-Mode monitor ($1700 list—I can't give you a pixels per dollar figure because the resolution varies). It lets you choose between six resolutions, everything from 36 to 120 dpi; refresh rates vary accordingly, from 60 Hz at 60 or 120 dpi to 92 Hz at 36 or 72 dpi. The highest resolution is 1664 x 1200, which gives you about 2,000,000 pixels—more than *eleven* times as many as on the regular Mac screen.

The L-View isn't as deep as the SilverView, so it doesn't take up as much space on my desk. The screen is too grayish-green for my taste, and contrast leaves something to be desired, but overall I prefer it to the SilverView, because of the versatility of its multiple resolutions.

Soon after we go to press, Sigma will be coming out with a new variable-resolution monitor, the MultiMode 120. It will use an upgraded tube that Sigma says "is brighter,

sharper, clearer and crisper." Unfortunately, the monitor (with the gray-scale card it comes with) will list for $3000.

external monitors for compact Macs *(Alan Winslow/AN)*

External monitors for the Mac Classics are now available from Generation Systems, Mirror, RasterOps and Mobius. MegaGraphics makes external monitors for the Plus—although we've heard they can overload the Plus's already marginal (and non-fan-cooled) power supply.

evaluating color monitors *(BB)*

Color monitors are beautiful, and they're a lot cheaper than they were just a couple of years ago. So why not buy one? For one thing, as Arthur mentioned above, they don't display text nearly as well as monochrome monitors. For another, although they're cheaper than they were, they still cost quite a bit more than black-and-white monitors. And finally, color may slow performance of normal operations beyond your tolerance, unless you spend extra money on accelerator cards.

But color is essential for many artists and designers, and it's a distinct advantage for games and graphics. So if you decide to go shopping for a color monitor, here are some things to consider (listed in order of how important I think they are):

- Is the screen image sharp? Trust your eyes. Sharpness depends on the shape of the screen's little glowing pixels, the nature of the mask that defines each pixel's edges, the number of pixels per square inch and the ability of the display tube to focus the three color beams to hit the same spots on the screen (this is called convergence, and a few monitors let you adjust for it—a very good feature).
- Is the screen big enough so that you don't have to scroll constantly? Thirteen- and fourteen-inch color monitors show an image area that's typically about 9½" wide by 7" high (about 11¾" diagonally, rather than the full 13"

or 14"). In Word 5 (say), a menu bar, title bar, ribbon and ruler at the top of the screen and a scroll bar at the bottom leave just a little over five vertical inches for text. Some monitors let you change the resolution, but that often makes the text on the screen too small to read comfortably.

- Does the monitor adhere to radiation standards? Sweden's are the most restrictive, and several newer monitors conform with them. (No one's *proven* that sitting in front of a cathode ray tube all day, five days a week, causes problems, so our benighted country doesn't insist on monitor safety.)
- Do you have room to view the screen from a comfortable distance? This is especially important for very big screens. (John Kadyk recommends a distance of at least one arm's length.)
- Is the screen image distorted? Look for a lack of symmetry, for lines that should be straight but aren't. (Some monitors have adjustments that let you correct distortion.)
- Does the image flicker when you're at a proper viewing distance?
- Are controls easy to reach and use?
- Does the screen display's color spectrum please you? You may have noticed that some brands of color film look redder or yellower than reality, while others are bluer or greener. The color balance of monitors varies the same way.
- Is there a way to change the color balance if you want—for example, to match screen color to a particular color in a 35mm slide?
- Is the monitor too big? Even the smaller ones are much bigger, front-to-back, than comparable monochrome monitors, and the biggest color monitors are monsters.
- Will your table or desk support the weight of a big monitor? Don't assume anything; my monitor eventually put a permanent curve in my table.

- Is the price right? Remember, unless you own a Macintosh with built-in video support—like the LCs, ci's, si's and Quadras—you'll have to buy a video card, and it may cost more than the monitor!
- Is the monitor compatible with other brands of computers? That shouldn't be a consideration for a Mac loyalist, but if you must connect the monitor to a non-Mac, you'll need one of the *autosync* (also called *multisync)* models.
- Are the instructional materials that accompany the monitor understandable? Useful? Comprehensive? An experienced user may not care, but a beginner or computerphobe may care a lot.

- Sony Trinitron tubes were once clearly superior, but recent improvements in tube design have more than evened the score. Don't let the Trinitron mystique confound your selection process.

I looked at color monitors in each of three size ranges: small (12" to 15"), medium (16" to 17") and large (19" and larger). I attached comparable monitors to the same computers, using 8-bit cards or built-in support for each. I ran the same word processing, spreadsheet and graphics programs and games. I used Larry Pina's Color Test Pattern Generator program (described toward the end of this section) to evaluate distortion, color balance and convergence.

You may want to use a color monitor for text (although it's a bad idea), so I also examined black-and-white text files. I checked for sharpness, clean whites and blacks, distortion and spurious images (lines on the screen that don't belong there). I looked carefully at each monitor, under the same lighting, and I was amazed at the differences. (John Kadyk also looked at some of these monitors; his comments follow mine.)

small color monitors *(BB)*

The Apple 13" RGB monitor has long set the color standard on the Mac, but its day may be passing. Its colors

were dark compared with other monitors—its black was decidedly blue and its white was gray. I found it impossible to get sufficient brightness and I also had a problem with dark shadow bars running across the screen. The fine dark line about a third of the way up is a Trinitron artifact you have to live with (it's the shadow of wire that stabilizes a grid that keeps the electron gun from hitting phosphors of the wrong color).

Text was sharply defined and easy to read. Geometry (circles and squares) was perfect. This monitor doesn't come with a tilt/swivel base (all the others do). The manual was complete and clear.

The controls were all there, but not easy to use, because only contrast and brightness are on the front; as with all the monitors in this entry (except the NEC), the seldom-used controls are on the back, which makes it hard to watch the screen while adjusting them (and you may well need to adjust them, despite claims that they were "set at the factory").

The Seiko SII CM1445, with its dark palette and Trinitron dark lines, greatly resembles the Apple, but letters were sharp and distinct despite the dark palette. (Contrast may be a problem only if you work where light levels are high and can't be reduced; some users may *prefer* less contrast.) Colors were decidedly muted, with a slight gray/green cast. The display was virtually free of distortion. The manual was good.

Both Mirror and Generation Systems put their label on the same Goldstar 14" monitor. Whites and blacks were clean, brightness high. Reds were slightly orange. Both monitors displayed some distortion—as if the test pattern circle was being pulled to one side, and that couldn't be corrected. The contrast of characters in documents was good, but characters in desktop labels were slightly soft.

These monitors come with the same manual, which is adequate. Be careful when tilting these monitors; their base is stiff, and you'll need to balance the monitor to keep from toppling the whole apparatus.

The NEC 4FG 15" monitor's usable screen area is about 10" (most are 9.5") wide by 7.5" high (compared to about 6" on the Apple). Its color was bright, clean and intense. You can choose a number of different resolutions (with a video card that lets you do that). The text looks a lot better when you switch from color to monochrome mode. The screen was free of shadows and lines.

very good feature

The NEC's controls are all up front, hidden behind a hinged panel. And the controls are effective. NEC's color matching system allows you to set screen colors to match an external color source, an important feature if you plan to send your work to a printer. NEC forgot to send us a manual, so I can't tell you about it, but the manual for the 21" NEC was a model of organization and content, so I'd expect the best. NEC's entire FG line complies with Sweden's radiation standards (see the *ELF and VLF* entry later in the chapter for more on this).

very good feature

If I were to buy one of these small color monitors, I'd choose the NEC. *[Which is exactly what I did. The color intensity and intelligence of design are stupendous. The downside is, I've become addicted to my screen blanker (After Dark's Gravity). I sit down to work and it's five minutes (if I'm lucky) before I can bear to move the mouse. I use a black-and white two-page display for 98% of my work, but this monitor is worth it just to watch the screen blanker on it. (No, I'm not really quite that frivolous. I need a color monitor to evaluate color programs.)—AN]* If I couldn't afford the NEC, I'd buy the Seiko.

more on small color monitors *(JK)*

Arthur and I looked at the same color monitors as Brad, and formed our own subjective reactions. Among the five

small (13–15") ones, the NEC stood out as the best in most categories: it's the brightest and has the sharpest text, the richest color and the most flat, color-neutral gray desktop. It's a big monitor for its screen size, though, as all NEC monitors seem to be.

Although the NEC's image area is ¾"–1" bigger (diagonally) than the other monitors, the resolution is the same (640 x 480); the pixels are just bigger, so whatever's on screen takes up more space. You can fix this by getting a video card that allows you to change the resolution, but part of these small monitors' attraction is that you don't need a card to use them with Macs that have built-in video ports, like the LC, si, ci and Quadras. Video cards cost hundreds of dollars, can't be installed in an LC, and use up the si's only expansion slot.

The Generation Systems Goldstar monitor has almost as beautiful color as the NEC, but doesn't measure up in overall image quality. The "gray" desktop has a sickly yellowish/greenish cast, and the whole desktop has an odd, sparkly sheen that makes text characters look fuzzy. Its twin, the Mirror Goldstar monitor, was virtually identical in every respect except that it lacks the Generation Systems display's brightness and exuberant color, and its text was even fuzzier.

The Apple and Seiko monitors were the dimmest, and showed grays as somewhat bluish (especially the Apple). But the Apple's text quality is nearly as crisp as the NEC's, and the Seiko's text was close to Apple's quality. Each had acceptable color quality.

Of this group of small monitors, the NEC was the best in nearly every respect. Its controls are all located in front for easy access, and can put the monitor through a greater range of adjustment than any of the others.

Here's a chart of the small color monitors we reviewed (don't forget that you have to add a video card to these prices):

mfg	*model*	*list price*	*resolution*	*dpi*
Apple	13" RGB	$1000	640x480	72
Gen. Sys.	14"	$765	640x480	69
Mirror	14"	$400	640x480	72
NEC	15" 4FG	$950	640x480	*
Seiko	14"	$750	640x480	72

** resolution depends on the video card used*

medium-sized color monitors *(BB)*

As with their 14" nephews, the 16" Mirror and Generation Systems monitors appear identical. Control location (on the left side) isn't ideal (unless you're left-handed), but it's better than on the back. Mirror includes software that provides large menu fonts, menu controls and panning. Neither produced sharp, easy-to-read text in either color or monochrome modes, but label and menu text was sharp and clear.

Both screens showed *pin-cushion distortion*—bowed lines—especially in the upper right quarter of the screen, and there was also *color fringing*—color showing up at the end of white lines when you're working in a monochrome mode. Blacks were strong, whites clean, but blurry text made these two impossible for me to use. An 11" page won't fit on these displays in WYSIWYG mode. Like all the machines in this group, these two come with a tilt/swivel base.

Apple's 16" monitor offers excellent text readability, except for a touch of softness in the screen's upper right quadrant. The controls are limited to just contrast and brightness. Colors were subdued but clear. Yellow was slightly mustardy. I noticed slight pincushion distortion along the right edge. There's an ADB socket at the base of the monitor, which is handy if you want to park your

CPU on the floor and plug your keyboard into the monitor. No special software comes with the Apple monitor.

Text on E–Machines' Color Page E16 (which is intended for the Mac LC) just wasn't clear enough for me, and pincushion distortion was evident. Color was slightly grainy, probably because of the monitor's anti-glare screen. Controls were accessible and complete. E–Machines provides some useful software—panning, for example, which allows you to view an image larger than will fit on the screen.

E–Machines' T16 is better than the E16, but the difference didn't justify its considerably higher price. The image area was slightly askew, and the convergence controls couldn't produce letters free of unfocused color at their edges. Grays and whites had a slight magenta hue. Severe pincushion distortion made the windows appear to recede about a third of the way down. *[Gee, Brad, it sounds a lot better.—AN]*

Color rendition was intense and well-defined. Controls included convergence and vertical window centering, mounted on the front, along with brightness and contrast. (If it matters, the E-Machines' case looked old-fashioned and busy, with scribed lines around the frame of the tube.)

Radius' Color Pivot is unique among color monitors because you can physically pivot the monitor to change the display from *portrait* (tall, vertical) to *landscape* (wide, horizontal). You physically rotate the display, and the image readjusts. Of all the color monitors I tested, the Pivot handled text best—it was clear and sharp—but it still wasn't as good as on the monochrome Pivot, or any other good monochrome display.

The Color Pivot's useful software (a Radius trademark) allows you to change the resolution from 72 dpi to 82 dpi and provides a screen saver, enlarged menu fonts and tear–off menus. In portrait mode, the Pivot displays a full

11" page, but in landscape mode, you can't really see two pages side by side. Controls are limited to contrast and brightness, and the manual was easy to understand and complete.

The Color Pivot is smaller than the other 16" monitors, which is important if your workspace is limited, but it's expensive, and it's only capable of 8-bit color. And there's another problem. All color monitors slow down scrolling. You can usually speed them up again with accelerators, but there's no accelerator that works with the pivot feature, including the Radius boards that the company indicates are "compatible." So scrolling is slow. Nevertheless, I liked the Color Pivot for its software, the quality of its image and its small overall size relative to its screen size.

❦ more on medium-sized monitors *(JK)*

Of the all the color monitors we tested, Apple's 16" was by far the most agreeable to the eyes. Although its resolution is slightly less than the other monitors' (70 dpi instead of 72), text is crisp and well-defined, and the image's overall effect is almost soothing. *[Good God, John, you're making it sound like a drug—or at least a meditation tape.—AN]* Black looked slightly brown and blue was a bit shadowy and dark, but otherwise the color was excellent—even flatter and more even than on the 15" NEC. Its red and green were far more intense than on any of the other monitors.

The Mirror and Generation Systems 16" monitors resemble each other even more than the 14" ones. They both use Trinitron tubes, which may be why their overall quality is so much better than the smaller models'. Text looks much crisper, but there's still a slight diffused sparkle over everything. The Mirror monitor's neat-o *[neat-o? NEAT-O?—AN]* software includes a screen saver and gives you pop-up menus in your applications, in addition to the features Brad describes above.

I was less impressed by the Radius Color Pivot than Brad was. When set to its brightest, it was the second brightest monitor of the group (after the E-Machines T16II), but there was a milky wash over the screen, which became apparent when the desktop was set to solid black. When all the monitors were adjusted to eliminate this wash, the Pivot became the dimmest monitor of the group. To me, the screen color was duller than on other monitors. And although the contrast and text quality were fairly good, the display seemed covered by a tiny grid, as if it were projecting through a stocking.

I liked the E-Machines' T16II quite a bit better than the E16. It had good color, was the brightest medium-sized monitor, and showed very clear, high contrast black on white characters. The contrast was a bit harsh compared to some of the other monitors, but overall I'd rank it second only to the Apple.

Here's a chart of the medium-sized color monitors we reviewed (don't forget that you have to add a video card to these prices):

mfg	*model*	*list price*	*resolution*	*dpi*
Apple	16"	$1600	832x624	70
Gen. Sys.	16"	$2300	*	*
E-Machines	E16	$1600	*	*
E-Machines	T16II	$2700	*	*
Mirror	16"	$1200	832x624	72
Radius	Color Pivot	$1550	640x870	72

** resolution depends on video card used*

large color monitors *(BB)*

Twenty-inch color monitors are *big*, and *costly*, and *impressive*. Buy a 20" monitor only if you genuinely need the large screen and have a place to put it; you'll find its presence overwhelming unless you can sit well back from it.

(That's hard to do with a monitor that's almost 20" deep; there's not much desk space left for your keyboard.)

[These monstrosities dominate whatever room they're in; it's like putting a dishwasher on top of your desk. You shouldn't seriously consider one unless you need it professionally, or are rich and have plenty of desk space (or grew up on a submarine and like to feel crowded).—JK]

[I love John's concept of rich: "Yeah, she's loaded. You should just see how much desk space she has."—AN]

I preferred the $3300 Radius and the $3000 RasterOps to the $2000 SuperMac because they have a larger image and their text was sharper (but not as sharp as on a good monochrome monitor; corner sharpness is a particular problem for color monitors, and the larger the screen, the greater the problem). The SuperMac's reds and blues are superb, but its other colors are less so—and they don't seem to harmonize (although it does come with color-matching software). The RasterOps' colors are clean, sharp and beautiful, and the Radius' are good but a little subdued.

The Radius has the most complete set of controls (too numerous and technical to describe here), and the SuperMac has the least (just contrast and brightness). The RasterOps' convergence controls helped increase sharpness. Radius bundles useful control software, as does RasterOps.

The resolution of the SuperMac is 1024 x 768 at 72 dpi. With the Radius and RasterOps, both figures depend on the card used. Other monitors in this class that are worth considering are the NEC 21" and Apple 21", both of which have resolutions of 1152 x 870.

multisync monitors *(DH)*

For technical reasons that probably aren't worth explaining, most PC monitors won't work with Macs. However, some companies specialize in making *multisync* (also

called *autosync)* monitors that work in both worlds—particularly NEC, which has been straddling the fence for years and has a good reputation. Don't just *assume* that any multisync monitor will work with any Mac—test it out before you buy.

❦ *external monitors for the PowerBooks* (DH)

Since the PowerBooks have no expansion slot, you can only connect external monitors to them through the memory expansion slot or the SCSI port. Sigma Designs has a 15" monochrome display for $1000 that plugs into the SCSI port, and they've built the video card—which includes QuickDraw acceleration—into the monitor. Radius' $600 Powerview is a SCSI device that lets the 140 and the 170 drive 8-bit color monitors.

Envisio offers combined memory expansion/video cards. There's a monochrome card that works with the 100 and comes with two megs of RAM ($500 list), and an 8-bit color card for the 140 or 170 that will drive a 13" monitor and costs $800 to $1600, depending on how much RAM you get with it (0–4MB). Since these cards connect directly to the CPU, they're considerably faster than the devices that connect through the SCSI slot, but some people think a card loaded with its full complement of RAM will overtax a PowerBook's power supply.

❦ *Test Pattern Generator* (AN)

If you really want to compare monitors, you need this nifty shareware program written by *Macintosh Bible* contributor Larry Pina. In addition to testing color monitors every way you can imagine (and several you can't), it also lets you measure the speed of printers.

Test Pattern Generator is very well done. You can get it in all the regular places (bulletin boards, user groups, etc.) and it also comes bundled with Larry's book, *Macintosh Repair & Upgrade Secrets.*

An even more powerful version, Color Test Pattern Generator, does a wealth of color-specific tests and also a whole bunch of non-monitor-related tests that troubleshoot and pin down what's wrong with your computer. (We used it to test the color monitors reviewed above.) You can get it by sending $10 to Larry at 47 Meadow Road, Westport MA 02790.

multiple screens (AN)

If you have two or more monitors connected to a Mac, icons for them will show up in the Monitors control panel. For the basics on this control panel, see the entry on it in Chapter 4.

One thing that isn't mentioned there is this little trick: hold down the Option key and a happy Mac icon will show up on one of the screens. That indicates which screen disk icons and the Trash will show up on. Like the menu bar, you can drag it to another screen; generally, you want the menu bar and the happy Mac to be on the same screen.

Keyboards

Apple's keyboards (AN)

When you buy a modular Mac, the keyboard isn't included. You have a choice of buying the 81-key standard keyboard ($130 list) or the 105-key extended keyboard ($230 list), which has a row of fifteen function keys (including *Undo, Cut, Copy* and *Paste*), a cluster of command keys—Home, End, Page Up, Page Down, Help and ⌦ (forward delete)—and extra ⌘, Option and Control keys to the right of the spacebar. I personally can't stand the planklike size of the extended keyboard (see the next entry), but some people like them.

Both of these *ADB* (*Apple Desktop Bus*) keyboards have jacks on either end, so you can plug the mouse into

whichever side you want (you use the other jack for connecting the keyboard to the computer). Several companies make six-foot ADB cables that let you get your keyboard (and mouse) farther away from the Mac.

You can chain up to sixteen ADB devices together (assuming each device has an in and out port; a mouse would have to be the last device on the chain). This can be useful if you like using a mouse for some tasks and a trackball for others (trackballs are described in the next section), or if you're training people and want them all to have their own keyboards.

Don't connect or disconnect your keyboard—or any ADB device—without first shutting down your Mac. If you do, you may ruin the motherboard on your Mac.

wanted: a non-Star-Trek, non-IBM-obsequious keyboard (AN)

In line with the traditional American belief that bigger is better, keyboard manufacturers, Apple included, keep going for larger and jazzier-looking keyboards. They seem to think that Mac users would rather feel they're commanding the Starship Enterprise than be able to reach the mouse without dislocating their shoulders.

Personally, I miss the tiny keyboard that came with the Plus and earlier Macs. I like the mouse *near me*, not six miles east of me (I probably wouldn't feel that way if I were a gibbon, but it's just my bad luck to have been born a human being), and if I preferred arrow keys and function keys to the mouse, I'd use a PC instead of a Mac and save some money.

All the current Mac keyboards share this slavish pandering to the world of IBM. Even on Apple's smaller keyboard, space is wasted on a numeric keypad and arrow keys. I got so tired of hitting the arrow keys by mistake that I pried the key caps off (it turns out they're delicious fried

up with a little garlic). But arrow keys are only a small part of the problem. Many's the time I've wondered if I couldn't just cut the numeric keypad off with a power saw, but I thought that might disturb the delicate electronics (it seems unlikely, but you never know).

The standard keyboard's Control key, which virtually no Mac programs use, is more than *twice* the size of the Option key, which gets used all the time. (Actually, I've found the Control key useful for creating macro commands that call up fonts with a single keystroke, but why can't they make it small and put it somewhere out of the way, as they do with the Esc key? And why isn't the constantly used Option key the same size as Shift and ⌘?)

I have nothing against people who need a bewildering array of keys for compatibility with PC software, or to do lots of computations, or whatever. And it's fine with me if *some* people prefer these yard-wide keyboards. I'm not suggesting making them *illegal.*

But why won't some far-sighted manufacturer *also* make a Mac keyboard that's small and efficient? No numeric keypad, no arrow keys, no IBM-obsequious function keys—just a 6" x 12" little keyboard designed to be used with a mouse, not for an interstellar journey to the planet of the IBM drones.

Epilogue: I've just about given up hope on this. I ran more or less the same entry in the Third Edition and it appears to have had absolutely no effect. You'd think some manufacturer would realize that I'd promote the hell out of a small, efficient keyboard if it existed, and that at least some of our twelve billion readers worldwide would be inspired to buy it as a result. But nooooooo. The manufacturers are all busy adding speed stripes and bicycle horns and ultrasonic bidets to their keyboards, and I'm just a voice crying in the wilderness. *[Violins up. Cut to Arthur shuffling despondently off into the sunset, a mutilated keyboard under his arm.]*

DataDesk keyboards *(BB)*

DataDesk's keyboard was one of the first that, for less than the price of Apple's extended keyboard, provided additional useful keys and an alternative "feel" which I find lighter...yet more satisfying. Now DataDesk produces two keyboards, the 101E and the Switchboard; both work with either ADB or pre-ADB Macs.

Both keyboards have Delete keys that work both to the left and to the right, and sets of Control, Option and ⌘ keys at each end of the spacebar, a real convenience. DataDesk's original keyboard came with software that let you create custom command keys, but these latest versions don't.

The Switchboard is similar in most respects to the 101E, but with this important difference: it lets you rearrange the alphabetic, numeric and special editing key sets, so that if, for example, you're left-handed, you can put the numeric keypad at the left end of the keyboard. What's more, you can substitute a trackball for either the special editing keys or the numeric keypad (I didn't have a chance to try the trackball, but it's a real space-saver for those whose workspace is tight). *[Yes, but you can't eliminate any components. Regardless of how you rearrange the elements the keyboard remains the same (large) size.—AN]*

I prefer the feel of the standard 101E to the Switchboard. But I like both better than the Apple keyboard and other third-party keyboards.

the Chord Keypad *(AN)*

Did you even wonder how court reporters manage to keep up? The typing system they use is inherently faster, because they hit more than one key at a time (chords, in other words) and the chords produce not merely letters but common words and phrases. Now there's a Mac keyboard that does the same thing.

very good feature

Produced by a company called Infogrip (in Baton Rouge, of all places), the Chord Keypad (also called a *BAT* for some reason they never explain) has only seven keys—one for each finger and three for the thumb. With one hand, you can type almost as fast as on a regular keyboard, and keep your other hand permanently on the mouse. Or you can put a Chord Keypad on each hand and really wail.

I got the evaluation unit of this product too late to test, but it's a great idea. As you may know, the standard qwerty keyboard was designed to slow typing down, to prevent early typewriters from jamming. They say learning the Chord Keypad doesn't interfere with regular touch-typing skills, because it's such a different activity. I say, more power to them.

keyboard mapping *(AN)*

mostly for beginners

The keys on computer keyboards aren't *hard-wired*—for example, the *x* key doesn't have to always transmit an *x* just because that's the letter on top of the key. The keys are *mapped* by software—that is, a program tells the computer what character to put on the screen when you hit a given key on the keyboard.

This means you can change the key layout to Dvorak, say, (that's a much more efficient arrangement of the keys than the standard *qwerty)* simply by modifying the keyboard driver software. (You could pry the key caps off and put them back down where they belong in a Dvorak layout if you wanted, but it's not necessary—regardless of what the key cap says, it will generate the character the driver software has mapped for it.)

QuicKeys is a utility program that lets you remap as many (or as few keys) as you want. For example, the way I have my keyboard set up, the [,] and [.] keys generate commas and periods even when the [Shift] key is held down, the [;] key gives me a curly apostrophe, the [{] and [}] keys give me curly quote marks, etc. When I need the usual

characters back, I just turn QuicKeys off with a simple keyboard command. (For more on this approach, see the word processing and utilities chapters.)

an si and LC keyboard problem *(JK)*

A lot of people I know have experienced a distressing problem with Mac si's (and some, although a much smaller number, with LC's). The Shift and ⌘ keys on standard (but not on extended) keyboards occasionally act as if they're stuck down, so that you get all caps or—even worse—a lot of unintended keyboard commands. If you tap the key that's acting stuck, it releases.

One night I typed a few words, looked up and sat in helpless terror as menu titles highlighted and unknown commands executed. All the text in my document was selected, centered and italicized. In a final burst of demonic possession, a new document window opened and the Save dialog box appeared.

Luckily I was working in Nisus, which has multiple undos, so I could reverse the unauthorized changes. Otherwise, it would have taken a while to restore the file to its previous state.

The problem occurs in both System 6 and System 7, in a variety of applications. It can't be strictly a keyboard problem, since only the si and LCs seem to be affected. Apple says they've had a few reports of this problem but don't know its cause or cure. It's apparently linked to the standard keyboard, since nearly all of Apple's in-house si's use extended keyboards, and they haven't experienced the problem.

Mice and mouse substitutes

✎ *of mice and then...* (RS)

There's nothing wrong with the mouse that came with your Mac, but like any other mechanical device, it may wear out or break, and then you'll have to replace it. Before you automatically get another one just like it, check out the alternatives described here. You don't have to choose just one; since they're all ADB devices, you can hook several of them together in a chain (whatever device is sending signals at a given moment is the one that controls your Mac).

✎ *MouseMan* (RS)

The top of Logitech's MouseMan ($120 list) is molded to fit your palm (there are versions for both the right and left hand). Since you don't have to grip the sides, you might find it more comfortable to use than Apple's mouse.

MouseMan has three buttons—one for clicking and two that can be programmed to issue frequently used commands. *[I find three buttons uncomfortable and confusing, as do most people (according to research Apple did before deciding on their one-button mouse).—AN]* You can adjust the resolution to up to four times that of Apple's mouse (400 dpi vs. 100 dpi); this lets you move the pointer more quickly, which is especially handy on larger monitors.

✎ *mice without tails* (AN)

I've often found the cord on my mouse getting in my way as I make the big, sweeping arm movements so typical of people with my particular constellation of neurological defects. Perhaps you have the same problem. The solution is a cordless mouse that transmits its motion to the Mac with an infrared beam. I've used one called Lester, from Lightwave Technologies, and found the movement a little jerky.

Randy Singer tracked down another cordless mouse, the Z-Nix's SuperMouse ($110 list). It has two buttons you can assign commands to. When you're not using it, you place it in a cradle on your desk to recharge it.

✎ *cleanlimouse is next to smoothlimouse* (SA/SM/AN)

Cleaning your mouse occasionally will keep it working smoothly. Remove the ring at the bottom of the mouse by turning it, and drop the ball out into your palm. Clean the three little rollers inside the mouse with a Q-Tip dipped in alcohol. Rub the ball clean with a cloth before replacing it.

To give the rollers a more thorough cleaning, there's a $15 kit from Curtis that's the epitome of simple yet elegant design. You put a drop or two of cleaning fluid onto a Velcro-covered ball that's resting on a Velcro pad, then put the mouse (with its regular ball removed) over the Velcro-covered ball and roll it around. It's easy, it's hygienic and...it's fun.

✎ *against mouse pads* (AN)

I have three problems with mouse pads. One is that they should be unnecessary—mice should be designed to work perfectly on any smooth surface. Unfortunately, they usually require more friction than you get from a desktop made of, say, a plastic laminate like Formica, especially when it hasn't been cleaned for a few days and has accumulated a thin residue of oil from your hand.

To solve this friction problem, I simply tape a piece of flat cardboard down on the desktop. It works like a charm, and has the added advantage of making the surface your hand rests on warmer to the touch.

The second reason I don't like mouse pads is that they restrict how far you can move the mouse. I'm always running off the edges of them, which is annoying. (The

cardboard can be any size, of course. Pro basketball players can use refrigerator boxes.)

The third—and by far the most important—problem with mouse pads is the dreadful chemical stench almost all of them put out when new. I just don't understand how people can buy things that smell like a toxic waste dump on a hot afternoon. And it's not as if the smell is merely unpleasant—it's almost certainly carcinogenic. (That's not some hysterical comment: vinyl fumes are known to cause cancer, as do many other plastic and rubber fumes.)

If you do buy a regular, carcinogenic mouse pad (although it's beyond me why you'd want to do that instead of simply using a piece of nonsmelly cardboard), at least leave it outside in the sun until it stops smelling (which may take months). You're playing with your health if you don't.

MousePen Pro *(RS)*

The MousePen Pro is one of those inventions that you look at and say, *why didn't I think of that?* It's small, light and shaped like a pen with a small ball at the end; you move the pointer by rolling the ball around on almost any surface—from a sheet of paper to your pants leg.

The MousePen is great to use with a PowerBook if you don't like the built-in trackball (trackballs are described below); you can put a Post-it on the handrest area below the keyboard to serve as a sort of mouse pad for it. It's also a natural for drawing or painting—although not as good as a graphics tablet (it doesn't respond to pressure and it's not as precise).

The body of the pen has three buttons. The one for clicking falls naturally under your index finger. Just above that is a button that lets you change the resolution from 100 to 1000 dpi on the fly. A third, smaller button further up lets you adjust how the pointer responds to the pen's

movement (the equivalent of Mouse Tracking). It lists for $100, from Appoint.

TouchWindow *(RS)*

Edmark's TouchWindow ($335 list) is a transparent touch-sensitive screen that attaches to your monitor. Tapping the screen twice in a particular location is the same as double-clicking there with the mouse. This opens up a lot of possibilities—finger painting on the screen, for example—but highlighting text might be a problem in small font sizes *[especially if, like Lisa Simpson, you've inherited a condition of the fingers known as stubbiness (that's my favorite of all the shows, the one where Bart decides he wants to become a cop)—AN].* You may only want to use the TouchWindow with one or two applications, and keep your mouse hooked up in the ADB chain for everything else you do.

UnMouse *(RS)*

With MicroTouch's UnMouse ($200 list), you move the pointer by sliding your finger over the face of a 3½" x 5" glass tablet, and you double-click by pressing down. There's also a large red button on the left side that gives you access to up to sixty macro commands. A stylus is included that turns UnMouse into a small graphics tablet. This product is truly versatile, but it's hard to get used to, so I strongly recommend you give it a thorough tryout before you buy it (or get a money-back guarantee).

MouseStick *(RS)*

There's nothing I hate more than having to use the keyboard to play an animated arcade-type game on my Mac. *[Really, Randy, nothing? What a charmed life you've led.—AN]* But now there's the MouseStick from Gravis. If you're a game junkie like me, it might be worth its $100 price just for that, but I really can't recommend it for other applications (even though it has a lot of speed and accuracy adjustments).

✎ *Felix* (RS)

Alta's Felix is a small, stationary unit with a little plastic box on top of it. You grip the little plastic box and move it within a one-inch square area; to click, you press a button on top of the box. You get used to it quickly, because it's so much like using a pen.

You can vary the Felix's resolution from 320 dpi to 1200 dpi; this very high resolution makes it a good choice for large screens. The Felix lists for $130 and comes with a 30-day money-back guarantee.

✎ *the Gold Brick* (RS)

The Gold Brick ($170 list) lets you plug *any* input device designed for Nintendo games, including the Mattel Power Glove and Brøderbund's Uforce, into the Mac's ADB port.

✎ *trackballs* (BB)

mostly for beginners

A trackball is like a mouse turned on its back. The ball (which varies widely in size) sticks out of the top, and you move it with your fingers, thumb or palm. Some people love trackballs (I'm one of them) and some people hate them. *[I'm one of them.—AN]*

I like trackballs because they require less space than a mouse, and control the pointer more precisely than a mouse (which is particularly important for graphics). All trackballs have a locking button that lets you drag things on the screen without having to hold the button down. Finally, most trackballs are easier to keep clean than mice.

important warning

Personal preference matters more with a trackball than it does with, say, a modem. If you decide to try a trackball, give it a fair chance. Ask for at least a few days to try it out, and your money back if you don't like it.

I tested seven trackballs, all strikingly different from one another:

Manufacturer	Model	List Price
Appoint	Thumbelina	$100
CoStar	Stingray	130
Emac	Silhouette	100
Kensington	TurboMouse	170
Logitech	Trackman	140
MicroSpeed	MacTrac 2.0	120
MicroSpeed	MicroTrac	90

Here's what I asked myself as I reviewed them (and that you should ask yourself when evaluating trackballs):

- Is the position of my wrist when I'm using the trackball easy or strained?
- Are there sharp edges on the housing that hurt my palm?
- Is the device too big or too small for my fingers?
- Do my thumb and fingers fall naturally on the buttons?
- Do I have to apply too much force to click the button, or do I have to apply so little that I click (or lock) it without meaning to?
- Is the trackball still easy to use if you're a lefty? *[What do politics have to do with...oh, I get it. Never mind. —AN]*
- Is the relationship between the movement of the ball and movement of the pointer precise? (This is important for graphics and small fonts.)
- Does it have *dynamic tracking*—the ability to make how far the pointer moves vary with how quickly you move the mouse? (It's useful to be able to move the pointer faster on large screens and slower when you're doing precise graphics.)

- Can the trackball's buttons be programmed to perform commands? Will you remember to use the buttons this way? Will you want to remember? (Personally, I find it distracting to have to remember that I have commands available in this unusual way.)

- Will the trackball work with the Mac Plus and earlier models? (This is obviously only a concern if you have one of those models.)

Although no single trackball set the standard in every area, two stood out from the rest—Silhouette and Stingray. Silhouette is big and solid, sculptural and beautiful. It sits so high I thought I'd have a hard time reaching up to it from the keyboard, but I didn't; in fact, it's one of the two most comfortable trackballs I evaluated.

very good feature

The Silhouette comes with four balls of varying weights (and colors). This seemed like a gimmick, but actually each size creates a significantly different feel. The action on all the balls is smooth but controlled; I can cover ground in a hurry, yet movements are very precise.

The distinctive shape and feel of the three buttons help you distinguish them. They're positioned for right-handers; left-handers have to click with the ring finger (a left-handed model is in development). The Silhouette's programmable button can only be assigned one key combination at a time.

very good feature

Stingray—my other favorite—is about a quarter of the Silhouette's size; it virtually disappears beneath your hand. The ball is small and easy to control, but it's slick, which means you sometimes need to manipulate it more than you should have to.

A pair of tapered wings, which function as two huge buttons, surround the ball. They're so sensitive you have to be careful not to click them accidentally. You can alter pointer speed and to select which button you want to use as the normal click and which as the click-lock—a boon to lefties.

Any one of the other trackballs might work well for you, but each suffered from what I felt was a significant flaw. MacTrac has velvety, quiet ball motion, but the ball sits too high on the base for my taste. Clicking the buttons

is smooth and easy, but it's a stretch to the middle key for an average-sized hand like mine.

As with MicroTrac (discussed below), you can use the buttons to execute many commands. You just hold down one button while clicking the other one to four times. (The problem is remembering how many clicks produce which result.)

For those who really like to assign functions to the keys, the Trackman's software is a dream of flexibility, and its ball is utterly smooth and nearly silent. But I didn't like the way the buttons were positioned. Even after I rearranged them (an option that's unique to Trackman—you can decide where the buttons go in relation to the ball), I couldn't get comfortable with it.

TurboMouse is the most expensive trackball I tested. The buttons flanking its large ball can be set for left- or right-handed use, and they can also be assigned a command-key combination. Unfortunately, the side-mounted ADB cable sockets make it impossible for the trackball to snuggle up against a keyboard. The ball action is good but not great (it ranges from a little grainy to a little too slick), and the lower edge of the case cut straight across my palm. (Turbo Mouse is available for non–ADB Macintoshes.)

At only about 1½" square, Thumbelina is well suited for PowerBooks and Portables. And because you can manipulate it in your hand without a mouse pad or other surface, it's perfect for giving stand-up presentations. The correlation between ball and pointer movement is pleasingly precise, but the ball is too small to have much momentum, so you can't speed down the screen by giving it a spin. This means that on large screens, you'll work too hard over long distances, even with dynamic tracking.

Thumbelina's ADB cable, which exits the bottom of the device, can get twisted, so that on-screen movements are

upside down or sideways. (To prevent this, you can bracket Thumbelina to the keyboard, with hardware that's included for that purpose.)

MicroTrac is about twice the size of Thumbelina. I found that still too small for comfort, but it was easier to use on the desktop than Thumbelina. Its ball and its three buttons are considerably larger, and it has just enough heft to stay put. It worked well for text, but not so well for graphics.

Protecting your Mac

basic Mac protection (LA)

The Macintosh is a pretty sturdy computer, but it's not invincible, so take a few precautions when you set it up. Heat can shorten hardware's lifespan, so keep your equipment away from direct sunlight and from appliances that generate heat. *[I thought there was a reason not to use my Mac II as an ironing board, and now I know what it is. Damn!—AN]*

Also make sure that the vents for the fans are not blocked. *[Yet another reason not to iron on the II. I guess it really was a bad idea.—AN]* Dust can contribute to heat buildup and can cause other problems (especially if it gets into your floppy drive), so avoid dusty locations. *[What about lint?—AN]*

While heat may cause problems over time, a sudden surge of power can trash your Mac in an instant, so make sure you use a surge protector, especially if you live in an area where blackouts or thunderstorms are common (but don't depend on a surge protector for protection against lightning; see the next two entries for more on that). If you don't have a surge protector, unplug your computer *immediately* whenever the power goes out, because when the power returns, it will do so with a surge.

Some people get an *uninterruptable power supply*, which switches to battery power if the electrical current stops flowing. They cost quite a bit, however, and the average user doesn't really need one—just remember to save your work frequently so if the power does go out you won't lose much, if anything.

Route your Mac's cables carefully so nobody can trip on them. A jerked cable can jar a hard disk and jeopardize your data. If a cable comes loose while the Mac is on, it can create serious hardware problems. Always turn the power off before plugging or unplugging SCSI or ADB cables—otherwise you could cause a short that can damage the Mac.

lightning only has to strike once *(C.J. Weigand)*

A surge protector is a good way to protect your computer from sudden variations in electrical current, and every Mac (and major peripheral, like a disk drive or a printer) should be on one. But don't rely on it during a thunderstorm. Lightning can arc across open contacts and do extensive damage to your equipment.

So if it's thunderstorm season where you live, get in the habit of pulling the plug out of the wall whenever you shut down your system for any length of time. That's the only way to make sure it's safe. If you have a modem connected to your Mac, also unplug the incoming telephone line or disconnect the cable. Your computer can be zapped just as easily by lightning striking your telephone line.

surge protectors *(AN)*

Panamax and Best Power Technology are two leading surge protector makers. The difference between their products and most of the ones you buy in a hardware store is like the difference between a Bentley and a Chevy.

Panamax even brags that its surge protectors are a thousand times faster than lightning. OK, let's say their surge protector senses the lightning and opens the contact. What's to prevent lightning from arcing over the contact? After all, it just jumped from a cloud to the earth. In fact, what's to stop a 200,000-ampere, ten-million-volt bolt of lightning from reducing the entire surge protector to a molten blob?

Panamax even warranties your own computer equipment—not just the surge protector—against damage by lightning! "See full warranty for actual conditions, limitations and claim procedures." I'd *like* to see that warranty (they didn't send me one); it must be a masterpiece of legal draftsmanship. There's got to be a clause in it along the lines of "your equipment is covered unconditionally unless the damage occurs on the planet Earth."

Anyway, silly warranties aside, these are good products and will protect your equipment against just about anything but lightning.

MacGard *(Larry Pina)*

In the middle of a dry New England winter, just walking across the room can build up a terrific static charge, especially around synthetic fabrics, rubber-soled shoes and wall-to-wall carpeting. Under these conditions, touching anything connected to an electrical ground results in a painful shock. Sometimes it's so bad, it triggers an instant lockup (on the computer, not you).

One solution is to use a $90 surge suppressor called MacGard. Besides superior surge protection (in lab tests I ran, it outperformed several units costing twice as much), it has an integral static-draining touch pad. When you tap it, you hear the same crackling noise that's normally associated with a painful shock but the discharge is much slower and completely painless. You can then touch your Mac safely.

covering the Mac (and its appendages) (AN)

To paraphrase an old saying, dust never sleeps, and the more of it that gets into your Mac, the worse off you are. Many people sell covers for the Mac, but the ones we like best are the Nycov brand, sold by Computer Covers Unlimited. They come in several colors, are attractive and well made, and are available for various models of the Mac, its peripherals, the keyboard and even the mouse. Best of all, they're made of high-quality, anti-static, rip-stop nylon, instead of vinyl with its nauseating, carcinogenic fumes.

[The MousGlove is a real-leather cover that fits perfectly over the mouse. It costs just $10, and is available in various colors from MacConnection.—RS]

Computer Covers Unlimited also makes The Keyboard Protector—a precisely molded piece of soft, flexible, relatively odorless, transparent plastic with little pockets for each key (there are models for many different keyboards). Unlike a dust cover, you leave The Keyboard Protector on while you work (always, in fact). It interferes with the feel of the keys less than I thought it would, but for my taste, it's still a bit too much like wearing a raincoat while taking a shower (to use the old analogy). Around G&B, they're known as *keyboard condoms*—an appropriate name, given what it feels like to type through one.

Still, it's a nice idea. Over the years, I've spilled many glasses of water near my keyboard (but somehow never directly on it). I now keep anything containing a liquid a good couple of feet away from my keyboard—a simple approach, but not foolproof (since my *mouth* is right over the keyboard). The Keyboard Protector *is* foolproof, and it protects against dust, staples and ashes as well as against spills.

regular maintenance (LA)

Routine care can extend your equipment's life and make it run more efficiently. Dust the Mac and clean the mouse

regularly (see *cleanlimouse is next to smoothlimouse* above). If you have a 1.4MB floppy drive, clean it occasionally with a floppy drive cleaner from 3M. (Apple recommends against using this type of cleaner with 800K or 400K drives. If you suspect dust may be causing problems with those drives, open the case and carefully blow the dust away, or have a repair shop do the job.)

Defragmenting your hard drive periodically with a hard disk utility helps your hard disk run faster and improves your chances of recovering data if your disk crashes (see Chapter 3 for more about this).

protecting the phosphor *(AN)*

mostly for beginners

The phosphor that's painted on the inside of your screen and glows when the electron beam hits it can become exhausted from too much use, leaving dark spots on your screen. For that reason, it's a good idea not to leave an image visible on your screen except when you're actually using the computer. But you also don't want to be constantly turning the Mac on and off, because that's hard on the electronics.

That's where programs called *screen blankers*, or *screen savers*, come in. They keep track of how long it's been since you hit a key or the mouse button and black out your screen automatically after a certain amount of time—which you select—has passed. They can also create some sort of moving pattern on the screen (fireworks, stars, a clock that moves around) so you know the Mac is on. Hitting any key or the mouse button brings back the image.

The bigger the screen is, the more important a screen blanker is. (They're discussed in the utilities chapter.) Fortunately, most big monitors come with their own built-in.

If you telecommunicate, make sure any screen blanker you use checks the modem port for activity. If it doesn't, and you're sending or receiving a file when it goes into

action, the connection will be lost and you'll have to start the file transfer all over again.

If you don't want to use a screen blanker, you can simply turn the brightness down when you get up from the Mac. Now don't feel that I'm patronizing you by telling you something as basic as that. I was once at the house of a very intelligent writer friend who uses her Mac extensively (and who has thanked me several times for not identifying her more specifically than this, for reasons which will immediately become obvious).

I saw an image on her Mac's screen, so I casually walked over and turned the brightness down to black. She had no idea what had happened and totally freaked out. I showed her how to adjust the brightness, but she wouldn't calm down until I turned it back up and left it there. Even then she had the sneaking suspicion that I'd done some sort of subtle but irreparable damage to her machine.

External monitors almost always have brightness controls as well, although they're sometimes not conveniently located and sometimes you can't turn the brightness all the way down. In any case, screen blankers are really the way to go.

leave monitors on or turn them off? *(AN/Todd Corleto/SM)*

Conventional wisdom—or at least conventional practice—among power users has always been to avoid the power surges associated with startup by simply leaving all computers, monitors, disk drives and the like turned on all the time (with screen-saver software installed to protect the screen, of course).

But David Rowe of Radius Technical Support tells us they've run in-house tests that prove the wear and tear of turning a monitor off and on is minimal compared to the wear and tear caused by leaving it on all the time. (They only tested Radius monitors, but it's probably true of all

brands.) So we've started turning all our external monitors off every night.

There's also the question of power consumption—which can be quite substantial in the case of monitors. This is a further argument for turning equipment off.

AppleCare *(AN)*

Apple's extended service contracts, which go under the name of AppleCare, provide the same coverage you get during the initial warranty period (free parts and labor for whatever goes wrong—unless, of course, you drop your Mac out a window, open its case or do something else Apple doesn't approve of). AppleCare is sold through Apple dealers, and it's not cheap. For example, suggested retail for PowerBooks is about $28 a month.

AppleCare isn't as essential as it was back in the days of power supplies that blew more frequently than Old Faithful, so whether or not you get it basically depends on your temperament and your finances. If you're a cautious type and/or can't afford a big, unexpected repair bill, get it; if you're a gambler and/or can absorb that big bill in the unlikely event it comes along, save your money. (Since there's profit built into AppleCare, the financial odds are in your favor if you don't buy it. But that's usually less important than peace of mind.)

the best way to ship a Mac *(Paul Blood)*

The best box to ship a Mac in is the one Apple shipped it to you in, except for one thing—it lets everyone know that a valuable computer is inside. The solution? Pull the box apart, then reassemble it inside out. All the same packing materials will fit. *[I love this tip. It's so simple and yet so ingenious.—AN]*

cables *(AN)*

Mac Kenny recommends System Connection in Utah for Mac cables (get shielded cables, he says—they're worth the extra expense). A couple of other good sources are Kensington and Monster. Many cable vendors will make a cable for you if they don't have what you want in stock.

spaghetti control *(AN)*

Just as trees typically have root systems underground that are the same size as the part of the tree you can see above ground, so computer systems seem to require as much room behind them for their tangled cables as they do in front of them for keyboard, mouse, etc. Computer Covers Unlimited has come up with a solution for that problem.

It's a plastic tube about an inch in diameter with a slit down it (two come in a package). Tuck all the power cords from various pieces of equipment into the tube (or tubes) and you've cut down on some of the spaghetti behind your desk.

Ergotron *(AN)*

Ergotron makes a very heavy-duty line of tilt/swivel bases for Macs and other ergonomic office accessories. For example, MacTilt is an ergonomic stand for a compact Mac that both raises it 4" and lets you position it just about any way you can imagine. It tilts 15° forward and 15° back, and rotates 360°. You can adjust the Mac with the touch of a finger, and it stays where you put it.

MacTilt is built so tough you can stand on it. That kind of construction doesn't come cheap but I think you save money in the long run by getting something this well-made.

Protecting yourself

screen filters and radiation shields (AN)

There's some evidence that working at a computer monitor may have deleterious health effects. For example, a large-scale study in California found a *doubling* of miscarriage rates among women who worked more than 20 hours a week at computer screens. This may not be due to the equipment itself, however; stress is generally higher among computer users than other types of office workers (probably because most of them don't have Macs).

According to James Sheedy of the UC Berkeley optometry school, working regularly at a computer screen can accelerate *presbyopia*, the inability to focus at varying distances that usually hits people in their forties. (That's definitely been my personal experience, but since I started using computers heavily when I was 39, I can't really tease apart the two factors...especially since I'm *still* 39.)

Other research has indicated that certain low-frequency radiation may have harmful health effects (see the next entry). In view of all this, it certainly can't hurt to cut down radiation coming from computers, so here's a bit of information on filters that screen out at least some of it:

There are two basic kinds of screen filters—glass and wire mesh. Wire mesh filters do a good job of screening out certain kinds of radiation, but I find them really hard to see through (it's like looking through finely woven cloth). For me, the strain of trying to focus through the mesh more than offsets any possible radiation-blocking benefit.

Whichever type of screen you get, make sure it's grounded. Filters vary enormously in how easy or hard they are to ground. The best system has a three-pronged plug you stick into a wall socket (only the grounding prong is active, of course); the other end of the wire connects easily to the filter.

There's also a system for reducing magnetic radiation by putting bands of magnetically conductive material *behind* the monitor, thereby giving the magnetic radiation an easier path to follow. When I saw this system at a trade show, it seemed to reduce ELF and VLF (described in the next entry) significantly but nowhere near entirely, and I haven't been able to check this out myself, since the idiots who make it refused to send me an evaluation unit to test. Maybe they're better engineers than marketers...but maybe not. We'll never know.

Other companies put conductive material around the neck of the picture tube, inside the monitor. This should work even better, but of course it's much harder to install.

Radiation comes in many frequency ranges, so it's easy for competing companies to claim superiority for their filters merely by restricting the scope of their comparisons (or by emphasizing different aspects of them).

An audiologist named John Barry Smith wrote in to John Dvorak's column to say that he thinks the problem is a high-frequency *sound* (15,750 Hz) which comes from scanning 525 lines 30 times a second. He says most computer monitors emit this tone, and that he's found it to be loudest on old color monitors. "Fortunately, most newer computer monitors now use a higher synchronizing frequency, as does the Macintosh, which scans at 22.1 kHz."

This is a complex subject, and you either have to spend some time learning about it or you need to rely on someone else's expertise. I used to rely on Mike Skaar, but he's left the consulting business and is now distributing ergonomic furniture (the Neutral Posture line, for example, which he says is great) and related products.

By the way, many people buy screen filters to cut down on glare (that is, reflections). This is not a good approach. What you need to do instead is set up the place where you work so as to *eliminate* reflections (for details on how to do that, see the entry below called *basic ergonomics).*

ELF and VLF (ByB/ND)

A study published in the *American Journal of Epidemiology* in 1979 indicated that children living near electric distribution lines tended to get cancer more often. A second study, published in 1986 by the New York State Department of Health, and a third study from Sweden, confirmed these results. The culprit seems to be sustained exposure to the *ELF (extremely low frequency)* electric and magnetic field created by the power line's 60Hz alternating current.

In 1982, a study in Canada discovered that the vertical scan rate of computer monitors also generates an ELF field of 60–75 Hz. In addition, the monitor's horizontal scan rate generates radiation in the 10–30 KHz range (i.e. 10,000–30,000 Hz). This is called VLF (for *very low frequency)*; it's easier to block with a screen filter than ELF, but there's a lot less of it and it seems to be less significant in creating the harmful magnetic field.

During the past five years, animal studies in California, Spain and Sweden have all confirmed the cancer-enhancing effects of sustained exposure to ELF. One theory is that cells become entrained to the particular pulse rate of the radiation, and that this unnatural rhythm then disrupts the normal activation of enzymes and cellular immune responses.

Macworld published an excellent, in-depth article on radiation from computers in its July 1990 issue, which included its own tests of ELF emitted from ten Mac monitors. (The article was written by Paul Brodeur, who literally wrote the book on this subject—*The Zapping of America*, which in 1977 first brought public attention to the issue. His more recent book, *Currents of Death: Power Lines, Computer Terminals and the Attempt to Cover Up the Threat to Your Health* is a great read.) Apple's popular 13" High-Resolution color monitor came out the worst. On all the monitors, the greatest amount of radiation

was in the back and on the sides, which can particularly be a problem in crowded offices.

The strength of ELF radiation drops off rapidly as you move away from the monitor, but since there's no way yet to screen out ELF, no one should sit closer than four feet from the sides or back of a monitor, or 28" (roughly arm's length) from the front of the screen.

Sweden has the tightest regulations governing ELF and VLF emissions, and monitors that meet their standards are the safest. Most computer and monitor makers soft-peddle the issue, but many now make monitors that meet Sweden's standards.

Some observers who have studied this issue, like veteran computer journalist Steve Rosenthal, say that the scientists don't yet know how the emissions harm us. He says that the research to date doesn't conclusively show that 28"—or the other oft-mentioned distance, 18"—is the magic number. Maybe the farther you are away from the screen the better, but maybe there's a particular distance that's dangerous and closer to *or* farther from the screen are both safer. Until the issue unclouds, you can follow the current wisdom and hew to the Swedish guidelines.

the importance of comfort *(AN)*

The importance of a comfortable place to work can't be overemphasized. Working on a computer is an *intensely* unnatural act for an animal that originally evolved to swing from tree to tree. And yet people usually pay less attention to making their workplace comfortable than they do to much less important (although still significant) issues like which disk drive to buy.

If you're going to sit still in front of a screen for hours and hours, tapping on a keyboard and moving a mouse around, make sure you can do that with the least possible discomfort. The following entries tell you how.

basic ergonomics (AN)

If you put a compact Mac and its keyboard on the same surface, either the screen will be too low or the keyboard too high. Modular Macs also share this problem to some extent, but you can tilt them up or down to compensate for their actual height. (You can do this with compact Macs too, if you buy a swivel/tilt base for them.)

For comfortable typing, your wrists should never be higher than your elbows, nor should they be bent. Depending on your (and your chair's) height, this often means the keyboard should be on a surface 24"–27" from the floor.

That will be great for your wrists, but maybe not so great for your lower back. The 24"–27" typing surface height was designed for women (since most typists have traditionally been women) and their average height is about 5' 4" or 5' 5". If you're taller than 5' 7" or so, typing on a surface this low will force you to sit on a chair that's too low for you, and that doesn't allow an open enough angle at your hips. (To avoid lower-back problems, the angle between your legs and your trunk should usually be more than 90°.) Even normal-height secretarial chairs can cause this problem.

Susan McCallister, who's 5' 9" and has a bad back, solved this by putting her typing surface more than 30" above the ground, and getting a drafting chair (with a tilting seat) to bring her up to it. Sometimes she sits on it (with the seat at various angles), sometimes she leans on it and sometimes she stands at the keyboard.

In any case, whatever height your chair is, the critical relationship is between you and the keyboard, not between the keyboard and the floor. Again: your wrists should *never* be higher than your elbows, or bent, when you type (it's worth repeating).

The bottom of the screen should be 4–8 inches higher than the surface the keyboard is on, so that you can look

at it comfortably without having to bend your head. And don't strain your eyes by putting it too close—allow at least a foot between the back of the keyboard and the front of the Mac.

However comfortable your workspace is, it's important to periodically change your position. Chris Allen says there's a highly rated ergonomic chair that slowly changes its position over the course of the day—automatically! It probably costs a fortune, but getting up and walking around every couple of hours (at least) is free—and very helpful.

Here's another tidbit from Chris: Just moving from the keyboard to the mouse can help prevent *carpal tunnel syndrome*, the painful wrist ailment caused by too much typing. It's the keyboard-only users who get it the worst (and I'm willing to bet that flexed wrists are a major factor in it).

[Mouse users can also get repetitive stress injuries (sometimes called RSI). In fact, certain mouse activities can be very stressful, since it's normally only a single finger that does all the repeated moving, and this motion occurs while the rest of the hand is partially flexed (to hold and guide the mouse).

It's worthwhile to experiment by alternating the hand you move the mouse with. The dexterity required is usually less than for normal writing, so even those of us who aren't ambidextrous can manage it.—DH]

Another vital issue is eliminating reflections from your screen. (Usually they're called *glare*, which is a misleading term.) You don't want any lights or windows behind the computer; in fact, it's much better to put a computer directly in front of a window than opposite one.

The best place for a light is on the ceiling (or bouncing off the ceiling) somewhere between you and the screen. I use one of those $10 swing-arm drafting lamps clamped to the shelf of a bookcase. The shade is turned to the ceiling and is about six inches in front of and three feet

above my left ear. When I'm working on the computer, that's the only light in the room (except, of course, for the light from the screen). There are *no* reflections on the screen.

To block the light from the windows, I have solid wooden shutters on the windows (built especially for that purpose). It's not hard to do; just get pieces of wood or particle board the right size (plywood warps) and use door hinges to attach them. If that's too much of a project for you, go to a photographic supply store and get some of the blackout cloth used to light-seal darkrooms. It's easy to install it with duct tape or push pins, but a pain to take down when you want to let some daylight into the room.

🍎 *cheap but effective computer furniture* *(AN)*

One way to put together a comfortable workstation is to put two tables together—a low typing table (24–27") in front for the keyboard, and a table of normal height (29–30") in the back for the monitor. A swivel can help raise the monitor (built-in or not) to where it should be, or just put it on a thick book or a sturdy box. (But see the *basic ergonomics* entry above.)

Another inexpensive approach is to find an old desk that has a typing well. Secure the well in the open position and use it for the keyboard, then build a higher platform behind it (using the edge of the opened typing well cover for a support) for the Mac and/or the monitor to rest on. (The platform doesn't have to be anything fancy; just a piece of plywood will do.) The only problem with *this* approach is that the typing wells on most desks aren't big enough to comfortably accommodate both a keyboard and a mouse.

🍎 *MacTable* *(AN)*

Several people I know love a work table designed specially for the Mac called MacTable. It's attractive and sturdily constructed of beechwood and plastic laminate. Made by

ScanCo, a small company in Redmond WA, MacTables are reasonably priced, and Brad Bunnin raves about their customer service. But see the next entry.

MacTable blues, and an alternative (CR)

Any manufacturer can say its product is ergonomic, but the proof is in the comfort you get. After nearly two years of typing discomfort and consultations with various experts, I've concluded that although it looks nice and its reps are friendly on the phone, MacTable is hardly the ergonomic achievement it's claimed to be.

The ANSI (American National Standards Institute) standard for workstations specifies a keyboard height of between 23" and 28". The lowest you can adjust the MacTable's typing surface is 26", and in that position only the front of the typing surface is that low. Since the surface slants up at 15°, the back rows of my keyboard are actually more like 28" off the floor.

This put the keyboard height at the top of the ANSI range, even when the table is as low as you can set it. This is fine if you're Michael Jordan, but I'm five feet seven and I have to raise my hands, elbows and shoulders too high to compensate. They end up sore.

The angle of the typing surface is also a problem. According to my physical therapist (Terri Hansford from Hand Therapy of San Francisco), keyboards should have no more than a 13° upward slope from the spacebar to the top row. Mac keyboards have this slope built in, so MacTable's extra 15° slant means you have to type uphill, flexing your wrist and extending your fingers far more than you should, and potentially causing pain or numbness in your hand and wrist tendons.

The only way to eliminate the 15° slope on the MacTable is to set the surface so it's flat—but then it's the full 28" off the ground. *[I find that even the Mac keyboard's normal*

slope on a flat surface is too much, and put a shim under the front edge to make it more level.—AN]

Take my advice—use the $330 you'd spend on a MacTable (and that's just for the smaller one) and invest in a plain, flat, hardwood table. With the money you'll have left over, buy an adjustable keyboard platform on a swing arm that screws to the underside of the table.

You should be able to find one at any big office furniture supply store or a Mac ergonomics company like ErgoSource. Then you can adjust your keyboard to any height you like. *[But make sure you get a keyboard platform that has room for the mouse to move around on. If you can't find one large enough, get two—one for the keyboard and one for the mouse.—AN]*

[Søren Storm of ScanCo wrote to complain about this entry (which he saw in an update to the Third Edition). He stated that their returns are lower than two percent and that Mac writers like Larry Pina, Steven Bobker, Bob LeVitus, C.J. Weigand and Jon Zilber "all rave about MacTable."

Still, he didn't address Charlie's main point, which is that MacTable's keyboard shelf can't be adjusted low enough for many people. If you're 5' 9" or more, you may be comfortable with a drafting chair (with a seat that tilts) that will get you high enough not to have to bend your wrists and raise your elbows to reach a keyboard on a MacTable (this will also help your lower back by opening the angle at your hips). But if you're shorter than that, your legs will probably dangle before you can get high enough.

Mr. Storm also pointed out that MacTable won the grand prize of the Vision '92 design contest at the International Woodworking Fair and that MacTables come with a money-back guarantee (but Charlie believes it's only for 30 days, which wouldn't have done him any good, because he didn't begin to have problems within that time).—AN]

Chapter 3

Storage and memory

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The basics

storage vs. memory *(AN/Chris Allen/RS)*

mostly for beginners

Even experienced Mac users are often confused about the difference between *storage* and *memory*. For example: why do you get out-of-memory messages when there's still plenty of room on your hard disk?

The confusion is understandable. Storage and memory are both ways of retaining information, and they're both measured in the same units—bytes, kilobytes, megabytes, etc. The difference is in how the information is retained.

With memory, information is saved *electronically* on *chips*, and in storage it's saved on *media*, either *magnetically* on disks or tapes, or *optically* on disks or CD-ROMs. (If you're unsure about any of these terms, see the glossary and/or the index.) The distinction between memory and storage isn't as theoretical as it may seem; there are dramatic practical differences between the two ways of retaining data.

When people talk about *memory*, they're usually talking about *RAM* (which stands for *random-access memory*, because you can access different parts of it in any order—although, actually, that's true of all kinds of memory). RAM is where computers temporarily keep information you're working with.

important warning

Although the information in RAM can be accessed very quickly, RAM is usually *volatile:* its contents last only as long as power is being supplied to it. If you turn your Mac off without *saving* your work, what was in RAM during your work session vanishes.

That's where storage comes in. Using an application's *Save* command takes information from RAM and puts it onto storage media like *hard disks* and *floppies* (both of which are discussed in detail later on in this chapter). Once

information is in storage, it's there permanently—or at least for a long time, assuming you take reasonable care of your disks.

It takes much longer to *write* (save information) to, or *read* (retrieve information) from, storage than memory. That's because storage devices involve mechanical moving parts, while the only things that move in memory chips are electronic impulses.

So memory is like your own memory—it's fast to put things in and out of, but when you die, everything in it disappears. Storage is like notes, letters, books and tapes—it takes longer to get information in and out of them, but they outlive you. That's the basic distinction, and it's a good, clear, useful one. Unfortunately, there are some exceptions to it.

ROM *(read-only memory)* is information that's built into the computer to tell it things like how to act when it's switched on. Although this information is stored on chips, like RAM, ROM retains its information permanently, because ROM chips can't be changed (at least not by mere mortals like us—there are machines that can change the data on certain kinds of ROM chips). Information is *stored* in ROM permanently, but ROM is *memory*—no wonder people are confused.

There are also ways to put aside some of your RAM and treat it like a very fast hard disk (this is called a *RAM disk)* and ways to put aside some of a hard disk and treat it like RAM (this is called *virtual memory).* Both are discussed in the *managing memory* section at the end of this chapter.

The analogy Chris Allen uses for all of this is interesting and may help clarify things. He says RAM is like the top of your desk and disks are like filing cabinets nearby. (To make the analogy more precise, imagine that the overzealous people who clean your office at night throw out everything they find on your desk.)

If you have a small desk (little RAM), you have to constantly run back and forth between it and your filing cabinets, because not many things will fit on top of the desk at one time. If you have a large desk (a lot of RAM), you have the luxury of not running over to the filing cabinets as often.

mostly for beginners

RAM disks are like drawers in your desk—smaller than filing cabinets, but convenient for some purposes because they're close at hand. ROM is like having some information permanently carved on your desk's surface so you can find it instantly (and so you'll never forget it).

bits, bytes, K, megs and gigs *(AN/SA/RS)*

A *bit* is the smallest possible unit of information (on a computer or anywhere else). It can represent one of only two things—on or off, yes or no, zero or one. Bits are the basic unit of measure for computers because computers are made up of tiny electronic switches, each of which is either on or off at any given time.

mostly for beginners

Magnetic storage media (disks and tapes) are composed of tiny, magnetically charged particles of metal that point either north or south. Since here again there are only two choices, the information on disks and tapes is also made up of bits.

(Working with bits means using a base-2, or *binary*, numbering system, as opposed to our everyday base-10, *decimal* system. In fact, *bit* is short for *b*inary dig*it*. But you don't have to know anything about binary numbers to use a computer; the computer automatically translates them into words, graphics, decimal numerals and so on.)

A *byte* is made up of eight bits, and thus lets you represent 256 (in other words, 2^8) different pieces of information (00000000, 00000010, 00000100, etc., on up to 11111111). In text, bytes are typically used to represent single characters (letters, numbers, punctuation marks and other symbols).

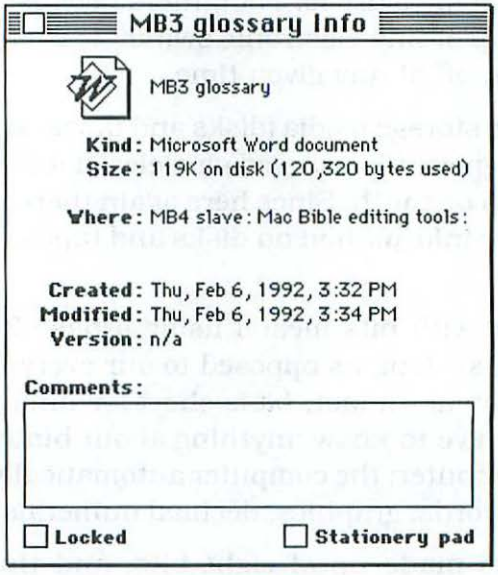
mostly for beginners

The next commonly used unit is quite a jump from a byte. A *kilobyte*, known familiarly as a *K*, equals 1024 bytes. Since the prefix *kilo-* means *thousand*, why 1024 bytes? Because computers are binary and normally increase their capacities in multiples of two: 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024 (a very familiar series of numbers if you've been around computers for a while).

very bad feature

Despite the fact that a K is 1024 bytes and always has been, some companies call 1000 bytes a K. It's not a mystery why they do that—it makes their products appear to have greater capacities. We call these shortchanged, 1000-byte K *mini-K*.

The *Get Info* window shown below gives the contents of a file, folder or disk in bytes and in K. (It appears when you select an icon on the desktop and hit ⌘I.)



Note that in this particular *Get Info* window, the bytes and K don't match up (since 120,320/1024 = 117.5, not 119). That sometimes happens, because the disk is divided into *sectors* (explained below in the entry on initializing

disks) and each sector can only hold information from one file. If a given file doesn't fill a whole sector, the number of K that are set aside for the file will be greater than the number of bytes in the file. This discrepancy can particularly mount up when you're dealing with folders that contain many files.

mostly for beginners

The next unit up from a K is a *megabyte* (usually called a *meg*—after its inventor, the 14th-century Swedish adventurer Meg Holmberg—and often abbreviated *MB).* A meg equals 1024 kilobytes or 1,048,576 bytes (2^{20} bytes). As is the case with K, megabytes are sometimes rounded down to a million bytes, which we call *minimegs.*

As storage devices become more and more humungous, the next unit of measure is becoming common: *gigabyte,* or *gig,* which is 1024 megs (2^{30} bytes). That's more than a million K and more than a billion (1,073,741,824) bytes. Marketing being what it is, we confidently expect gigs to be treated as an even billion bytes instead of as their true value—which, as you can see, is more than 7% higher.

gossip/ trivia

Gigabyte and *gig* are both pronounced with hard *g*'s (as in *go).* We mention this because *gigawatt* (a billion watts) is often pronounced with a soft *g* (like the *j* in *jig)*—as it is, for example, in the movie *Back to the Future.* You may remember the moment when Doc Brown, in 1955, staggers into his living room, grabs a framed picture of Thomas Edison and yelps at it: "1.21 gigawatts! Tom! How am I going to generate that kind of power?"—followed a moment later by: "Marty, I'm sorry, but the only power source capable of generating 1.21 gigawatts of electricity is a bolt of lightning....Unfortunately, you never know when or where it's going to strike."

(After that last paragraph appeared in the Third Edition, Michael J. Paris wrote us a letter in which he pointed out that the prefix *giga-* is the same one used in *gigantic* and thus should not only have a soft *g* but a long *i*—which is

mostly for beginners

also how the International System of Units says it should be pronounced. Well, maybe it *should* be pronounced *JAI-guh-byte*, but we've *never* heard anyone actually pronounce it that way. From a usage standpoint, the issue has been decided—in the US, at least.)

Anyway, here's a summary of the main units of storage and memory capacity:

8 bits = 1 byte
1024 bytes = 1 K (1000 bytes = 1 mini-K)
1024 K = 1 meg (1000K = 1 minimeg)
1024 megs = 1 gig (1000 megs = 1 minigig)

In practical terms, for text, one K equals about 170 words—1024 characters divided by the six characters (counting the space) in an average word. So a bunch of plain-text files totaling one meg would contain about 175,000 words—enough to fill three or four average-sized books.

But that doesn't take into account the fact that most files contain formatting information (the fonts and font styles used, for example) and all files contain *overhead* (the size, shape and location of the window in which the document appears on the screen, and similar information). The amount of overhead in a document depends on which application created it. A Word 5 document with just one word of text in it takes up 3K of space, a SuperPaint 2 document with one tiny line drawn in it occupies 8K, and an Illustrator 3 document with a tiny line takes up 10K.

how disks work *(AN/SM)*

Most computer disks are magnetic; they consist of an iron-oxide coating (the *medium)* on a *substrate*. In the case of floppy disks, the substrate is...well...floppy. It's a flexible plastic similar to recording tape. Inside the rectangular, hard plastic case, it's doughnut-shaped—round with a hole in the center.

On hard disks, the substrate is hard. It's usually made of aluminum and is called a *platter.* Typically, there's more than one platter in a hard disk drive (so calling it a hard *disk* isn't really accurate).

Read/write heads put magnetic charges into the iron-oxide coating (when writing to the disk) and check to see what the charges are (when reading from the disk). Double-sided floppy and hard disk drives (and almost all drives are double-sided by now) have two read/write heads—one on the top of the disk and the other on the bottom. The read/write heads are mounted on arms in much the same way that needles are mounted on the tone arms of record turntables, and they move in toward the center or out toward the edge as the disk spins.

Since iron oxide is what rust is made of, you can think of the contents of magnetic media as stories written in rust with a magnet. (With *The Macintosh Bible,* you don't just get information—you get *poetry.* Not *good* poetry, of course—for that you have to buy the deluxe edition—but poetry all the same.)

Optical disks are usually made of rigid plastic or glass, coated with a complex metal alloy. Some optical disks are *read-only;* common examples are music CDs and the CD-ROMs that Macs and other computers get information from. The information is put on these disks in the form of little dents, which then reflect the light of a laser when being read.

Other optical disks can be written to as well as read from. They're enclosed in a hard plastic case and look a bit like floppies, but in terms of capacity and speed, they're more like hard disks.

There are two ways information is put on optical disks. In the *magneto-optical* method, a laser heats a tiny spot on the disk to about 150° C (hot enough to cook a three-minute egg in two minutes), at which point that spot

takes on the polarity of an electromagnet located underneath it (one of the characteristics of the metal alloy coating being that its polarity only changes at very high temperatures). The different polarities reflect light differently, and that's how the laser reads the information.

In the *phase-change* method, when the laser heats a tiny spot on the disk, it changes to a crystalline state, which is shinier than the unheated parts of the disk. The laser then reads the pattern of shiny and dull spots.

initializing disks *(AN/Chris Allen/RS/Hal Lewis)*

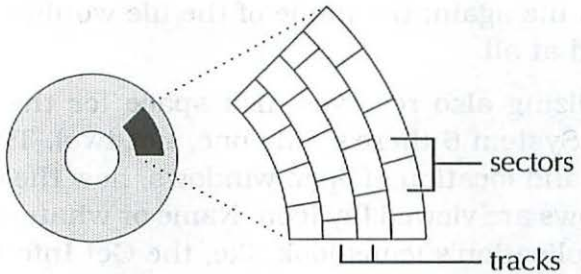
mostly for beginners

All disks, hard or floppy, have to be *initialized* (or *formatted)* before you can use them. Here again, Chris Allen has an analogy that may prove helpful. He says a new disk is like a huge, blank sheet of paper. (You can double the amount of information on a piece of paper by using both sides, so double-sided floppies have twice the storage of single-sided floppies.)

What formatting does is draw a numbered grid, like graph paper, that gives you boxes to put information in. Imagine information as filling in one of these little boxes or leaving it blank. The finer you make the grid, the more little squares there are to put information in, so high-density disks can contain more information in the same space.

The grid itself occupies some space, so you have less room on a formatted disk than on an unformatted one. (When comparing hard disks, be aware that a 105MB hard drive from one company may have no more storage space than a 100MB hard drive from another company, if the first company is advertising unformatted capacity and the second formatted capacity.)

This is a good analogy, but since disks aren't square, instead of columns and rows they have *tracks* (rings around the disk) and *sectors* (divisions within a track). It looks sort of like this:



The size of the sectors varies with the capacity of the disk. The sectors on floppies are always 512 bytes (half a K, in other words). On hard drives, they range in size between 512 bytes and 4K, and as drives continue to get bigger, so will sector size.

Initializing a floppy is easy. When you insert a virgin floppy into a Mac, you get a dialog box that tells you *This disk is unreadable:* and asks *Do you want to initialize it?* Simply click either the *One-Sided* or *Two-Sided* button. (To abort the process, click the *Eject* button.) But beware: if you get this message when you insert a disk that already contains data, think before you respond, because initializing will erase the disk's contents.

Initializing a hard disk should be equally easy, but some drives come with confusing initialization software. (That's why it's important to consider more than just price when you're shopping for a hard drive. See the section on hard disks for more on this topic.) Fortunately, most hard disks come already initialized.

❦ *the directory and desktop files* (RS/SA/AN/SM)

Initializing reserves part of a disk for special files, one of which is called the *directory*. Like the directory in an office building, which tells you which companies are in which offices, the directory on a disk keeps track of which files are in which sectors. Every time you save a file to disk, its location is recorded in the directory. If it weren't, you'd have to know the actual track and sector locations

to find a file again; the name of the file wouldn't do you any good at all.

Initializing also reserves disk space for the *desktop files* (in System 6 there's only one, not two). They store the size and location of open windows, how the contents of windows are viewed (by Icon, Name or whatever), what each application's icons look like, the Get Info information for every file, etc. In other words, the directory keeps track of where files are stored *on the disk* and the desktop files keep track of how their icons and windows are displayed *on the screen*.

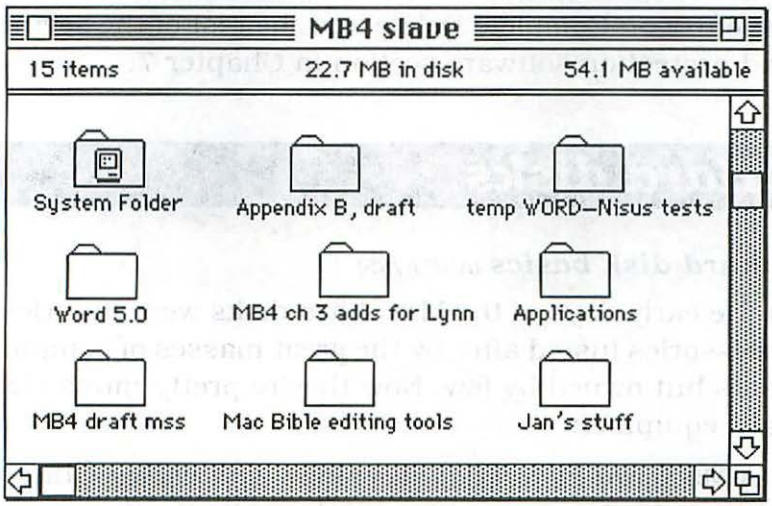
The more windows and different kinds of icons you have, and the more often you've moved things around, the larger the desktop files get; periodically, you need to *rebuild* them, which tidies them up by getting rid of obsolete information. (For how to do that, see the entry called *rebuilding the desktop* in the hard disk section below.)

Both the directory and desktop files are normally invisible—that is, they don't show up on the desktop. But you can get to them with programs like DiskTop or most of the other file-handling software described in the utilities chapter.

In the 800K disk window shown at the top of the next page, the *in disk* and *available* figures add up to 767K; the other 33K are occupied by the directory, desktop files and similar housekeeping files (boot blocks and other things you don't want to know about). These invisible files usually account for about 2% to 4% of a floppy disk's total capacity.

The situation is somewhat different on hard disks; a certain amont of space is reserved for the directory, desktop files, etc. regardless of whether the disk contains one file or a thousand. In other words, the room left for invisible files depends on the *capacity* of a hard disk, not on its *contents*. It also varies with the *brand* of disk—from about 3% to 8% of the total capacity.

Below is a window for an 80-meg hard disk. Its actual capacity is 82,069K, which means the directory, desktop files, etc., are taking up about 3426K, or a little more than 4%.



deleting and recovering files (SA/AN/RS)

When you delete a file from a disk, whether by dragging it into the Trash or by using a *Delete* command, the information isn't actually removed; the directory is simply told that the sectors previously occupied by that file are now available for storing new files. The deleted file remains on the disk, until it's overwritten by new information being put into the sectors in which it's stored.

Certain utility programs, described in the *recovering data from disks* section of Chapter 8, can locate where files are on disk even after the directory has been told to forget about them. Some of these utilities do that by maintaining their own separate directory as a backup. But remember—the easiest way to recover files is to back them up regularly (for more on that, see the section on backing up disks later in this chapter).

Sometimes you *want* a file to completely disappear. If it's on a floppy, you can remove it completely by reinitializing the floppy. If it's on a hard disk, however, you obviously wouldn't want to reinitialize the whole hard disk just to get rid of it. For how to deal with that situation, see the entry on Complete Delete and the rest of the security and protection software section in Chapter 7.

Hard disks

hard disk basics (AN/SA/RS)

In the early days of the Mac, hard disks were luxuries—accessories lusted after by the great masses of computer users but owned by few. Now they're pretty much standard equipment.

A Mac running off floppies alone isn't useless, but it's difficult to do any serious work on it. So if you can't

afford to buy a Mac with a hard disk, you probably shouldn't buy the Mac at all.

(As of this writing, you can buy a 105-megabyte external hard disk for around $425, and smaller drives are even cheaper. For more details, see the entry called *which brand to buy* later in this section.)

Unlike floppy disks, where the disk and its drive are two separate items, *hard disk* and *hard drive* are (typically) two names for the same thing—a metal case inside of which are one or more rigid disks, or *platters*, stacked on top of each other, a mechanism to spin them, and the *read/write heads* that put data onto, and take data off of, the disk(s).

Each platter has its own set of read/write heads (top and bottom). While the read/write heads of floppy disk drives actually touch the disk, in hard drives they float over the disk on a cushion of air that's thinner than a human hair. The tolerance is so fine that the smallest dust particle can cause trouble. That's why hard disks are sealed.

One advantage of hard disks is capacity—they store a lot more data than floppies. That's because the magnetic particles on a hard disk's platters are smaller than the ones on floppy disks, so a lot more information can be packed into a lot less space. It's convenient to put everything on your hard disk, so you don't have to wonder which floppy a particular file or application is on.

But the preeminent advantage of hard disks is speed—open the same file from a floppy and a hard disk and you'll see the speed difference right away. That's because hard disks spin faster than floppies and because, with the information packed more closely, the read/write heads don't have as far to travel.

Also, since a hard disk is always spinning, there's no waiting for it to come up to speed. (One final reason hard disks are faster: you don't have to spend time looking for, inserting and ejecting all those floppies.)

Three factors affect the speed of hard disks: *fragmentation*, *interleave* (both described in their own entries below) and the method used to move the arm on which the read/write heads are mounted. The fastest hard disks use a *voice coil* (similar to the magnet that moves the cone in a speaker); it moves the heads almost instantly. Slower ones use an electric motor (called a *stepper).*

Before a hard disk can be used, it has to be initialized (described in the entry called *initializing disks* above). Some manufacturers make you do that yourself, but usually a hard disk is already initialized when you buy it.

internal vs. external hard disks *(AN/RS)*

mostly for beginners

An *internal* hard disk is one that's mounted inside the Mac itself. Since you don't have to buy a separate case, an internal hard disk is cheaper than the equivalent external hard disk. It takes up no desk space, and you don't have to lug a separate piece of equipment around when you're moving your Mac.

But there are also several disadvantages to an internal hard disk. It makes your Mac heavier and more fragile. If it breaks, you'll be without your Mac for the interim (unless you pull it out of the Mac). And when you need to diagnose whether your hard disk or your Mac is causing a problem, it's a lot easier to disconnect an external hard disk and plug in a different Mac than it is to remove an internal hard disk.

important warning

Another disadvantage of an internal hard disk is that it uses the Mac's *power supply* (the component that converts the 110-volt AC from your wall socket into DC electricity of a lower voltage, so your Mac can use it). The power supplies on many Macs, especially the LC and si,

are quite marginal, and you might not want to subject them to the extra load of an internal hard disk. (Several manufacturers, notably Quantum, have come out with low-power versions of their most popular internal drives just for the LC and si.)

Because the LC's case isn't very tall, it will accept only very low-profile drives. Several are available in the 50MB-to-240MB range. You may not get as good a price or exactly the capacity you want with these specialized internal drives, so be sure to shop around.

If you use one Mac at work and another at home, an external drive has another advantage— you can just carry the drive back and forth instead of having to remember what to put on floppies. (See the *portability* entry later in this section for more on this.)

❦ $/meg *(AN)*

The first things to look for in a hard disk are reliability, support and length of warranty. Then you want to think about price, and the best way to evaluate that is dollars per megabyte of capacity. Just take the cost and divide it by the number of megs the drive holds (but don't rely on *advertised* capacity—see the next entry for more on that). The lower the number, the better.

The final consideration is speed. All hard disks are pretty fast (though, again, *advertised* speeds don't always have a lot to do with how fast a hard disk actually is when you're using it). *[The speed of a disk matters most when you're using applications that access the hard disk frequently—like animation programs, CAD (computer-assisted design) software and some games—but it's noticeable even in a program like Word.—RS]*

❦ untruth in labelling *(AN)*

With very rare exceptions, the number of megabytes a manufacturer says you get is a lot more than the actual

capacity of the drive. It's really a disgrace how completely unprincipled this has become.

First they all treat a *megabyte* as a million characters (it's actually 1,048,576 characters—almost 5% more). If you don't think that's significant, I'll be happy to take a 5% commission on everything you buy. But even using these *minimegs* (as I like to call them), they lie.

In my time, I've owned a "45MB" hard disk that actually held 42 megs (43 minimegs), a "144MB" hard disk that actually held 134 megs (137 minimegs) and a "535MB" hard disk that actually held 507 megs (519 minimegs). I'd tell you the brands but it wouldn't be fair to them, because most manufacturers do the same thing. On the other hand, I'm happy to give some good publicity to FWB, whose Hammer 300 drive holds 312 megs.

Another way drive manufacturers cheat is by advertising the unformatted instead of the formatted capacity. So—ignore a drive's advertised capacity in megs. Get its actual, *formatted* capacity in bytes, divide by 1,048,576, and use that in your $/meg calculations. Don't think for a moment that you can compare the price per meg of two drives until you've determined what each one *really* holds.

which hard disk to buy *(RS/AN)*

We're not big enough to set up a comprehensive program of hard disk testing, so what we'll give you here are just some rules of thumb. Still, like most rules of thumb, they're based on a lot of experience, ours and other people's, and they should serve you well.

Almost all hard drive vendors buy the guts of their hard disks—the actual disk platters, read/write heads, etc.—from someone else. They add a power supply, a case, cabling and some software, and put their name on the outside. So the first and most important rule of thumb when buying a hard disk is: *The manufacturer of the disk mechanism itself is more important than the name on the case.*

(It's true that it's the vendor, not the actual manufacturer of the drive mechanism, who's going to provide the support. But even the best vendor isn't going to be able to provide good support if all their drive mechanisms start going bad, and if the drive mechanisms don't fail, you won't *need* support.)

That's not to say that all hard disks with the same mechanism are created equal. The better ones have robust power supplies that aren't prone to failure, shielding around power supplies and wiring (to protect against data loss and interference with the Mac itself), sturdier cases and the like. Still, the mechanism is what matters most.

In our opinion, the best actual drive mechanisms are CDC (originally made by Control Data Corporation, now made by Seagate). The CDC Wren mechanisms in particular are famous for continuing to run while being shot from cannons, but they only come in larger sizes—about 300 megs on up.

Most people we know seem to think that the best mechanism for smaller drives is made by Quantum (despite some problems that developed with the internal Quantum drives sold by Apple in Macs). We have several external Quantum drives and have been quite happy with them.

Up to about 220 megs, Quantum makes the fastest mechanisms, although Maxtor also makes some competitively fast drives and so does CDC (at the upper edge of the range). Seagate and Conner make the slowest drives in this range—but from 300 megs on up to a gigabyte and beyond, Seagate's are the fastest.

(Things move fast in this field, so these guidelines may well be out-of-date by the time you read them. The best way to see where things are currently is to check the most recent comparison tests in *Macworld* and *MacUser*.)

In our experience, the worst maker of drive mechanisms was Rodime (now out of business). We had Rodime

mechanisms in three different makes of drive at the office and had problems with every single one of them. Rodime drives also tended to be expensive and slow.

Since you won't always know which drive mechanism a manufacturer uses (they sometimes switch, or even use several suppliers at the same time), you have to insist on the mechanism you want. In fact, you'll sometimes want to insist on a particular *model* of mechanism.

For example, in the 100-megabyte range, a Quantum LP105S (LPS) is preferable to the older Quantum ProDrive 105S. Other mechanisms to look for are the Seagate ST2373 in the 330-meg range, the Quantum PD425S in the 410-meg range, the Seagate ST4702 in the 600-meg range, the Seagate ST4767 in the 650-meg range and the Seagate ST41600 in the gigabyte-and-beyond range. (However, these model numbers may already be out-of-date by the time you read this, given how fast the industry's changing.)

Another important factor in choosing a hard disk is the software that comes with it. Most drives come initialized, but if yours doesn't, initializing it can be either easy or hard. If your drive's initialization software is frustrating to use, don't despair—there's software you can buy separately that will initialize virtually any hard drive (and will often make it run faster too). The best such programs are Silverlining, which also comes with La Cie drives, and Hard Disk ToolKit, which also comes with FWB Hammer drives.

Drives often come with software that defragments your disk (see the entry on *fragmentation* later in this section) and that helps you recover accidentally deleted files. We'll mention some of these utilities below as we describe the drives they come with, but for details about them, see Chapter 7. Among the best software that sometimes comes packaged with drives are Norton Utilities and MacTools Deluxe.

A second rule of thumb for buying hard disks is: *Get the longest warranty you can,* and a third is: *Buy from a vendor you know and trust, and hope they don't change*—manufacturers' warranties don't do you any good if a company collapses, as those of us with Jasmine drives discovered.

Jasmine was once the premier Mac hard drive manufacturer. A series of problems ranging from mismanagement to receiving a batch of defective mechanisms from a supplier sent them into bankruptcy, which left a lot of customers with defective drives. Although Jasmine had fine warranties, no one was left to honor them (although several repair companies did take pity on Jasmine owners and offered to fix their drives at a discount).

Because of intense competition, the hard drive market is no longer as profitable as it once was. Many small (and even a couple of large) hard drive companies may not survive, so be careful who you buy from.

The fourth and final rule of thumb for buying hard drives is: *Talk to people who've had good, hands-on experience, and get the same kind of drives they have.* Unfortunately, drive manufacturers come and go, and the quality of their products sometimes seems to wax and wane with the phases of the moon. So the fact that a friend has had good luck with a particular brand is no guarantee that you will too, months or years later. Still, your friends' experience may be more current than ours, given the time lag inherent in publishing a book.

Now that we've covered the rules of thumb and the best mechanisms, it's time to talk about the actual hard disk brands we like the best. Drives from FWB and MicroNet most often win the comparison tests in *MacUser* and *Macworld,* and this goes for almost any size drive these companies sell. Their products also offer the highest-quality construction, but you'll pay dearly for these advantages.

FWB's Hammer drives in particular have a reputation for costing more than the competition.

La Cie is owned by the largest maker of hard disk mechanisms—Quantum. It stands to reason that they'd know how to get the most out of their own mechanisms and, in general, they do. (Another advantage: since Quantum is a huge company, they're unlikely to go out of business and leave you with an orphaned, unwarrantied hard disk.)

Although La Cie hard drives aren't as fast or as bullet-proof as FWB's and MicroNet's, and are rarely the very best performers in their class, they're always near the top and their quality is high. They come with one of the best formatting programs on the market—Silverlining—and one of the best utility packages—Norton Utilities. La Cie drives are sold only by mail order, directly from the company. Their prices usually are competitive, which makes them one of the best deals around.

La Cie is an abbreviation for *la compagnie*—French for *the company*—and is pronounced *lah SEE* (just when referring to this US manufacturer, that is, not in France, where *& Cie.* is used the same way *& Co.* is in English—at the end of company names).

Many mail-order houses put drives together themselves; one of the best is APS in Independence, Missouri. APS offers drives built around many different mechanisms. Their prices are excellent and their products are solid, well-made, middle-of-their-class performers. (How does APS do it? Apparently they just make less of a profit than most other vendors.)

APS even provides a toll-free support number, staffed by knowledgeable, friendly people (and an adequate number of them). The company is famous for near-heroic feats of service and repair. Arthur's office has bought many APS drives and has been very happy with both the product and the company.

Although APS drives do come with a formatter and a good selection of public-domain software, they don't include a first-class commercial utility, so you won't get useful things like a backup program. On the other hand, you won't pay for programs that you don't want, and you can buy a utility like Norton or MacTools separately.

Another good mail-order house that makes its own hard drives is MacProducts of Austin, Texas.

Ehman drives were once among the lowest-priced on the market, and they tended to be reliable. Recently they've been redesigned, and are prettier and of better quality. Still, it's hard to recommend this company's equipment, since they're having serious financial troubles. If the company doesn't survive, any product you buy from them could become an orphan, with no support or warranty service available to you.

Ehman has been known for abysmal customer support in the past. Members of a local user group report hearing one of Ehman's support people being consistently rude to a customer who was having problems with one of their products.

Cartridge drives and portable hard drives are also worth considering; they're described in the next few entries. (Also see the entry called *using SCSI drives made for PCs* in the *SCSI devices* section below.)

portability *(RS)*

The easiest ways to transport large amounts of data from one Mac to another are with a cartridge or a portable hard drive. Other methods that will soon be practical are very-high-density floppies (discussed in *the future of floppy drives* in the floppy disk section below) and optical floppies (discussed in *the future of hard drives* at the end of this section).

A cartridge is a removable hard disk that looks like a giant floppy disk. There are three types—SyQuest, Bernoulli and Ricoh—and they're all incompatible with each another. Each type of cartridge holds about 45 megabytes (SyQuest also has an 88MB drive).

In general, cartridge drives have the reputation for being less reliable than hard drives, particularly when chained with many other SCSI devices (for more about SCSI, see the next section). SyQuests are considered the most quirky, but they're also the fastest, cheapest and most popular, which is important if you plan to exchange cartridges with other people. (See the next entry for more details and a different opinion.)

Ricoh is the newest, easiest to use and most reliable type of cartridge, but it's also more expensive and slightly slower than SyQuest. Bernoulli is a solid performer, but it's slower and more expensive than the other two.

Many companies don't advertise which mechanism they use in their cartridge drive, so make sure you ask. The companies that offer the best values in hard drives also tend to offer the best values in cartridge drives (see *which hard disk to buy* above).

An increasingly popular alternative to cartridges are minidrives based on the Quantum 2.5-inch GO hard disk mechanism, which is smaller than a pack of cigarettes and was developed for laptop computers. Minidrives based on the GO are lightweight, very reliable and use minimal power, yet perform as well as larger hard drives. Quantum makes 40MB and 80MB versions of the GO mechanism. La Cie and Liberty are two companies that make minidrives based on it.

Minidrives can be made even smaller and lighter by leaving out the power supply and fan (without the power supply to heat up, there's no need for a fan). Some are even small enough to fit into your shirt pocket! Such

models get power from the port in the back of the Mac that's designed to plug external floppy drives into, from an AC converter that plugs into the wall or from a *docking unit*, a base you insert the minidrive into that contains a power supply and a fan.

Before you buy a minidrive that takes its power from the floppy port, make sure your Mac's power supply can handle it. Some Macs with marginal power supplies (like the Plus, LC or si) can't handle the extra current draw and might fail. So get the manufacturer's assurance that the drive will work reliably with your model of Mac, or buy a drive that plugs into a docking unit or AC converter instead.

SyQuest cartridges *(Chris Allen)*

One of the most popular kinds of hard disk is the 44MB removable cartridge manufactured by SyQuest, yet you never see the SyQuest name on a case. That's because other manufacturers package SyQuest's drive with their own case, power supply and custom software, and then sell it under their own name.

All SyQuest drives function basically the same. Their 44MB cartridges are interchangeable, and even the software from one company can often be used on another company's drive (although this isn't recommended).

While SyQuest drives typically cost twice as much as regular hard drives of about the same size, additional cartridges are cheap—anywhere from $60–$120. Obviously, the ability to pick up another 44MB of storage for about $100 is very attractive, and most SyQuest drive owners accumulate five or ten cartridges in no time at all.

SyQuest drives are as fast as ordinary hard drives—in fact, with an access time of about 25 milliseconds, they're faster than most of Apple's drives. But they're also louder, so they're primarily used for backup and archiving rather than as primary units.

[SyQuest drives use some impressive technology. The platter is made from a very hard nickel-cadmium slurry which is coated with a fluorocarbon many times more slippery than Teflon. To fling dust and other junk off it, the disk spins up to 4200 rpm when you turn it on, then back down to its operating speed of 3260 rpm.—AN]

SyQuest drives are good for people who work for clients, because you can put each client's data (or each project) on a separate cartridge, leaving your applications and personal files on your main hard disk. SyQuest drives are also useful for desktop publishers—many typesetting service bureaus now have them, so that customers with large documents or complex images to print can bring in a cartridge instead of a raft of floppies. *[If you work with scans, color, EPS files or long page-layout documents, cartridges aren't merely useful when going to a service bureau—they're essential.—AN]*

The press has generally given the SyQuest technology good reviews, but some people claim that the cartridges aren't reliable (like Randy, in the *portibility* entry). I personally believe they're as reliable as any hard drive on the market—if you treat each SyQuest cartridge with the same care you'd accord to a regular hard drive. For example, you shouldn't leave cartridges in your briefcase on the back seat of a car parked in the sun.

Lots of companies sell SyQuest drives, including PLI (Infinity 40 Turbo), Mass Micro (DataPak drives), MicroTech (R50 drives) and AIC (Slimline). *[I recommend MacProduct's Magic 45—it's well-built, yet at $600 list, it's one of the cheapest SyQuest drives on the market.—RS]*

The Infinity 40 Turbo from PLI is reported to be the most reliable SyQuest drive. It comes in a one-drive and two-drive configuration ($900 and $1800 list respectively). Both are designed to fit under a compact Mac; if you're using them with a II, you can stand them on their sides. PLI's drive software is among the best—elegant and full-

featured—and you also get public-domain files, a collection of shareware, clip art and software demonstrations.

Mass Micro's drives come in three shapes. One is for putting under compact Macs like the Plus and SE; it has a slight tilt to position the Mac screen for better viewing ($900 list). The second fits perfectly on top of a Mac II, IIx or IIfx; its styling is coordinated with those machines and it has room for two SyQuest drives or a SyQuest drive and an ordinary hard drive ($1100 list). The third shape is sized and styled for the Mac IIcx and IIci ($1000 list). All these drives come with the SUM utilities.

MicroTech's R50 only comes in one shape—a traditional rounded-corner box that fits under a compact Mac ($1300 list). MicroTech's drive software is almost as good as PLI's. The drives come with a copy of Norton Macintosh Utilities and Transport, a Mac-to-DOS file-sharing program.

[We've used AIC drives for years and have had good luck with them. At least one model I have is quieter than any other SyQuest drive I've heard.—AN]

There are a lot of other SyQuest drives on the market, including some generic brands that have no label on the case. Be sure to check out the drive software with a dealer or a friend before purchasing a no-name brand (actually, this is good advice before purchasing any no-name hard drive).

❦ *Liberty portable hard disks* (Chris Allen)

Liberty Systems makes a wide range of small and portable hard disks. Their 70-series drives are only two inches wide, five inches tall and seven inches deep (just a little larger than a floppy disk drive), yet they hold from 40 megs to one gigabyte of data! Liberty's 20-series minidrives are just 1⅜ inches wide(!), three inches tall and five inches deep, into which Liberty manages to squeeze a power supply and up to 80 megs of data.

Everything is included in the case; there's no external power supply, just a standard power cord you plug into the wall. (There's also no fan, so these drives are virtually silent—although the lack of a fan might make them run warm and reduce their reliability.) SyQuest cartridges may be a little smaller and lighter, but they require an expensive drive at both locations.

The mechanisms in the smaller Liberty drives (under 105MB) are Quantums; in one-gigabyte drives, it's a Toshiba. Liberty drives come with a two-year warranty if you buy a carrying case, and a one-year warranty if you don't.

You get only the most basic software with these drives, but at least it's reliable. Liberty's manual isn't great, but their telephone support is adequate. Liberty only sells direct to consumers, without discounts, so the prices below are not only list but also what you'll actually pay.

As of this writing, the 40MB 70-series drive costs $700, the 80MB $950, the 105MB $1050 and the one-gigabyte drive $2700. The 40MB 20-series minidrive costs $900 and the 80MB $1000. The carrying case is $30 in nylon or $50 in leather.

✎ *future hard drives* (RS)

As with many other hardware technologies for the Mac, the future of hard drives is here now—providing you're willing to pay for it. You have to also be willing to invest in a standard that may never become common and may lose support at any time.

Hard drives are becoming faster and faster, and one way to get blazing speed out of them is to bypass the SCSI port (described in the next section) entirely and connect directly to your Mac's internal NuBus slot or the processor direct slot (PDS). MicroNet's NuPort and Storage Dimension's Data Cannon both use this approach, but these boards add $600 and $900 (respectively) to the cost of the hard drives.

A new drive on the market that holds a lot of promise is the 3.5-inch, 128MB read/write optical drive from DGR Technologies. At $1500, it's priced competitively with SyQuest drives, holds much more data on a much smaller cartridge, and is faster and much more reliable (optical disks are practically indestructible). It's hard to predict whether this standard will become popular—only time will tell—but if you're in the market for a drive with a transportable medium or unlimited capacity, and you don't have to worry about compatibility with other users, you should check this one out.

WORM drives *(write once, read many)* let you add information to an optical disk, but once it's there you can't alter it. Megabyte for megabyte, these drives cost considerably more than hard disks. *[Rewritable optical drives have superseded WORM drives for all but specialized uses by lawyers, accountants or others who need a permanent audit trail.—Chris Ferino]*

care and feeding of hard disks *(AN/DC/RS)*

Hard disks are remarkably tough, but cruel and unusual punishment can damage them. The most important rule is not to move a hard disk when it's turned on. And when you move it, pick it up—never scoot it across the desk surface.

However, you don't need to worry about this with the tiny, 2.5-inch hard drives in laptop or notebook computers, or with stand-alone drives built around the same mechanisms. They're designed to withstand the abuses of portable operation.

Another thing to avoid is rapid temperature changes. Don't carry a hard disk around in your trunk all day in the dead of winter, then bring it inside and start it up right away; give it a couple of hours to warm to room temperature.

When you transport a hard disk, make sure its heads are *parked.* Most hard disks automatically park the heads each time you shut down (this is the right way to do it); others require that you specifically tell them to park the heads.

turning hard disks on and off *(AN/RS)*

You should always turn on your hard disk(s)—and any other peripherals—first, wait until the hard disk is up to speed, and *then* turn on the Mac. When shutting off the Mac, follow exactly the opposite procedure—first turn off the Mac (by choosing *Shut Down* from the Finder's Special menu), then shut off your hard disk(s) and other peripherals.

The reason for these procedures is to insulate the Mac from surges caused by turning peripherals on or off. If the Mac is off when you switch a peripheral on or off, it can't be harmed.

accidentally shutting off a hard disk *(SA)*

If you accidentally turn off your hard disk during a work session, as I once did—don't panic. Just turn it back on. There are only two times when your Mac will know the difference; if you were in the middle of opening a file, you'll have to try opening it again; and if you were in the middle of saving a file, you probably won't be able to get at it unless you know how to recover damaged files (see the section called *Problems with disks* in Chapter 8).

organizing a hard disk *(AN/RS)*

The general principles of good organization apply to hard disks as much as to anything else. Prime among these, of course, is *apfeaeiip.* By an incredible coincidence, the letters that make up this word (which, as you undoubtedly know, means *good housekeeping* in Fijian) are also the initials of the English phrase *a place for everything and everything in its place.*

Apfeaeiip is, of course, an unattainable ideal. That's why you need a *wrong-place box.* I came upon this concept when living with four roommates. We'd take turns straightening up but that was an impossible task when all kinds of stuff, of indeterminate ownership and importance, lay randomly about the house.

So we got a big cardboard box and put it in a central location. Then we had a meeting and agreed where things belonged. From that point on, if anything wasn't in its place, whoever was straightening up put it in the wrong-place box. If you couldn't find something where you left it, you just looked there. (This sounds sort of fascistic, but it was actually a very simple and easy way to deal with the problem.)

If you share your hard disk (and maybe even if you don't), you need a wrong-place box—a folder called *need to be put away, left in the wrong place* or the like. You just pop things in there when they're in the way and then periodically, when you don't have anything more pressing to do, you open that folder and figure out where all the stuff in it really belongs.

There are two basic ways to organize folders on a hard disk—by type of application (graphics, word processing, databases, etc.) and by type of work (Project A, Project B, budget, personal, etc.). In general, it makes sense to use both kinds of folders, even though you'll sometimes forget whether a given document is filed under a work category or under the kind of application that created it.

One folder that tends to become unruly on most people's disks is the system folder, which contains multiple extensions (called *inits* in System 6), preference files automatically created by programs, scrap files and so on. A shareware utility called Tidy It Up! by Guy Fiems does a good job of organizing your system folder logically (according to parameters that you set).

Don't lay down a rigid organizational scheme and then be afraid to break out of it. For example, if you use a particular program frequently, it's fine to put its icon by itself out in the disk window (also known as the *root directory)* even if all the related programs and documents are in a folder.

By the same token, if you use one particular document most of the time you use a given application, put its icon, rather than the application's icon, somewhere easy to get to—not where related programs and documents are kept.

Another approach is to create one or more *templates* for each application you use frequently. You open the application, set all the parameters the way you want them (size and position of the document window; position of any tool palettes; default font, size and style; Page Setup preferences; etc. etc.), then save it as *[Application name] template.*

In System 7, you can save any document as *stationery* (in other words, as a template), so that every time you open it, it shows up as *Untitled.* In System 6, some applications let you do that. If the one you're using won't, be sure to *Save As...* as soon as you open the template. Put your templates in a special folder that always stays open on the desktop and you won't have to go rooting around in program folders whenever you want to open an application.

This kind of approach is made even easier by System 7's ability to make *aliases* of applications and documents (described in further detail in Chapter 4). You can put an alias anywhere you want, and it gives you instant access to the original application or document. You can even add aliases to the menu. Of course, you have to organize aliases too, but a growing number of utilities are being designed to help you do that.

Viewing files by Date and Name is a lot more efficient than viewing by Icon or by Small Icon. List folders and programs by name and documents by date (so the ones

you worked on most recently rise to the top of the list). Combining list views with careful positioning and "staircasing" of nested windows allows the maximum amount of data to be viewed.

System 7's outline feature (in list views) lets you see the contents of a folder without opening the folder's window. That may work better for you than staircasing windows, though the little arrows waste a lot of space on the left side of the windows. (There's more about this in Chapter 4.)

One last general rule: *it's your desktop.* You can do whatever you want with it. There's no right or wrong way to organize things. In particular, remember that you can name your folders whatever you want. (Arthur has one called *dealing with psychopaths*—which, unfortunately, is chock full of stuff.) Feel free to reorganize and rename folders and files often—a good desktop is constantly evolving.

a fleet is only as fast... *(DC)*

If you have more than one hard disk connected to your Mac, you'll find that returning to the desktop from an application will only be as fast as the slowest drive connected. You can speed things up somewhat by keeping all the windows on the slower drive(s) closed.

rebuilding the desktop *(RS/SA/AN/SM)*

The desktop files keep track of deleted files as well as current ones, which means they just keep getting bigger. Since these files have to be read each time the desktop is displayed, starting up and returning to the Finder can get pretty sluggish. When this happens, *rebuilding the desktop* (files) will delete all the obsolete information they contain.

To rebuild the desktop on the startup disk, hold down Option ⌘ while starting your Mac (or while inserting the disk, if your startup disk is a floppy). Another way to do it is to delete the current desktop files with a utility like DiskTop

or DiskTools that lets you work with invisible files. When you return to the Finder from the utility, new desktop files will be created. (System 6 also lets you rebuild the desktop by holding down Option⌘ when exiting an application, but this doesn't work under System 7.)

When you rebuild the desktop, you lose any comments you typed in Get Info boxes, but everything else will be fine. (A number of shareware programs are available that preserve your Get Info comments when rebuilding the desktop; your local user group or bulletin board should know about them.)

If System 7's desktop files get corrupted, folders can disappear from the desktop. Simply rebuilding the desktop with Option⌘ won't bring these folders back, because it doesn't delete the old desktop files and rebuild them from scratch.

Apple's released something called System 7 Tune-Up (available from dealers and users groups). Once installed, it prevents the problem from occurring. They're also working on a version of Disk First Aid (the troubleshooting utility that comes with all Macs) that will fix the problem. By the time you read this, System 7 will most likely have had Tune-Up incorporated in it.

If it hasn't, try using a utility like DiskTop, MacTools or Fedit to make these desktop files visible. Then rename them to anything other than their original names and restart your Mac. This will force the Mac to create new desktop files from scratch. Finally, throw the old, renamed desktop files into the trash.

If you try to rebuild a hard disk's desktop file while running MultiFinder under System 6, you may get a message that there's not enough memory to complete the operation. Switching out of MultiFinder and starting again with Option⌘ held down usually takes care of that problem.

fragmentation (SA/RS/Hal Lewis)

Each sector on a Macintosh floppy holds 512 bytes, or half a K, of information. On hard disks, sectors can be as large as 4K—and they're getting bigger as hard disk sizes increase. Still, most files are bigger than 4K (not to mention half a K), thus they occupy several sectors. Large files may take up several tracks.

When a disk is relatively empty, a file is stored on it in contiguous sectors, one after the other; this makes for fast saves, and for fast reads when you want to open the file later. But after you've been using your disk for a while, things get messy.

Let's say you start by saving three files to disk: A (which takes up ten sectors), B (five sectors) and C (fifteen sectors). Your disk will now look something like this (for the purpose of saving us hours of extra work on these illustrations, please ignore the fact that, on a disk, sectors are arranged in concentric circles, not in a grid):

A	A	A	A	A	A	A	A	A	A
B	B	B	B	B	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C

Now you erase file B, which frees up five sectors. You create a new file, D, and save it to the disk, where it requires eight sectors. The first five go where B was and the last three are put after file C. Now your disk looks like this:

A	A	A	A	A	A	A	A	A	A
D	D	D	D	D	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C
D	D	D							

Next you edit file C and save it again—oops, it needs more than fifteen sectors now, so the overflow is put after the second part of file D. Now your disk looks like this:

A	A	A	A	A	A	A	A	A	A
D	D	D	D	D	C	C	C	C	C
C	C	C	C	C	C	C	C	C	C
D	D	D	C	C	C	C	C	C	C
C	C	C	C						

And so on. As your disk gets fragmented (actually, it's the *files* that are fragmented, but the phrase everyone uses is *disk fragmentation*), both reading from it and writing to it really slow down.

Fragmentation occurs on all disks that get a lot of use, but because floppies are relatively small and slow anyway, it's really only a concern on hard disks. For what to do about fragmentation, see the next entry.

defragmenting hard disks *(RS/AN/SA)*

Once a disk is fragmented, you're not stuck with it that way—all you have to do is *defragment* it. Programs like DiskExpress, SpeedDisk (part of the Norton Utilities) and Silverlining rewrite all the files so they occupy contiguous portions of the disk. The best of the defragmentation utilities use a technique called *prioritization;* this puts your most-used applications and documents on the most accessible parts of your hard drive, which speeds things up even more.

Always back up your work before you defragment. If the computer crashes or the electricity goes off, you risk losing the files that are temporarily in memory while they're being transferred from one part of the disk to another.

Several defragmentation programs give you the option of having the program continuously defragment your hard-disk in the background while you're doing other

work. Although this sounds efficient, it's safer to wait till you're done working and do a complete backup before defragmenting.

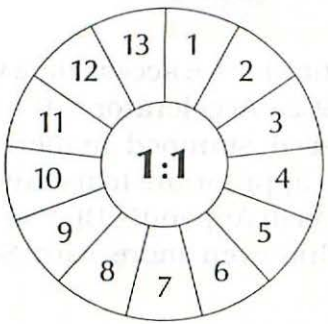
For one thing, background defragmentation isn't completely reliable, and you could lose any work you haven't yet backed up. Even worse, if there's a power outage while your hard disk is defragmenting in the background (which it might be at any time), all the data on your hard drive can be scrambled or lost entirely. Even if all goes well, background defragmentation can be annoying, because it makes your disk cycle constantly, even when you're not doing anything.

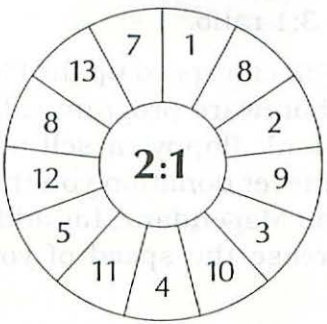
Defragmenting can take quite a while. Start the process going at the end of the day and let it work overnight. When you return to your Mac in the morning, your disk will be defragmented and ready to go at full speed.

❦ *interleave ratio and disk speed* *(SA/RS/Hal Lewis)*

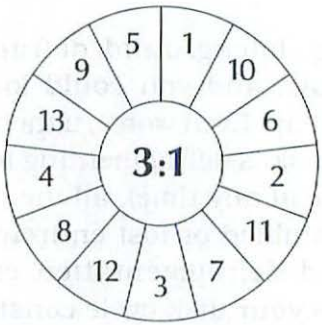
The *interleave ratio* controls how the sectors are organized on each track of the disk. A ratio of 1:1 means that the sectors are in straight numerical order—1, 2, 3, etc. A ratio of 2:1 means that numbers skip to every *other* sector—1 is the first sector, 2 is the third sector, 3 is the fifth sector, and so on (which numbers are on the intervening sectors depends on how many sectors there are altogether).

Here's what those two interleave ratios look like (except, of course, there are actually hundreds of sectors in a track):





A 3:1 ratio means that sequential numbers are on every third physical sector, as shown in the illustration below:



A 1:1 interleave allows information to be read the most quickly, since the Mac can read all the sectors in just one revolution of the disk. But some Macs just can't read that fast. They'd still be digesting the information from sector 1 while sector 2 whizzed by and then they'd have to wait another revolution of the platter till sector 2 showed up again—and then they'd miss sector 3.

On the other hand, if your hard disk is using a slower interleave than a particular Mac can handle, the Mac is just twiddling its thumbs waiting for the next sector to show up while the interleaved ones go by. And *that's* why when you initialize a hard disk, you're asked to indicate which computer you'll be using it with.

Quadras, all Mac IIs and SE/30s process data fast enough to use the 1:1 ratio on their drives. Regular SE's need the 2:1 interleave. Pluses are slow readers and need the 3:1 ratio.

You can speed up the Plus's hard drive access time with a shareware program called SCSI Accelerator 7.0 (send a blank floppy, a self-addressed stamped mailer and whatever donation you think is appropriate to its author, Chad Magendanz; his address is in Appendix B). You can increase the speed of your Plus even more with Scott

Berfield's shareware Speedometer, which measures the efficiency of different interleave ratios and finds the best one for your system. You should be able to use a lower number with the help of SCSI Accelerator. (For more on SCSI, see the next section.)

SCSI devices

SCSI basics *(SA/AN)*

mostly for beginners

SCSI is a standard developed by certain computer companies (Apple prominent among them) for connecting hard disks and other devices to computers. It stands for *small computer system interface* and is pronounced *scuzzy*. (It was almost pronounced *sexy*, which is closer to how the letters actually read, but Apple chickened out.)

Most hard disks are SCSI devices, as are many scanners, CD-ROM drives and non-PostScript laser printers. Since this is the storage and memory chapter, we'll focus on hard disks, but most of the information in this section applies to any SCSI device.

SCSI hard disks are significantly faster than their non-SCSI predecessors. Another benefit is the ability to link SCSI devices together, creating a *SCSI chain*. The Mac can then access any of the devices on the chain.

The Plus was the first Mac to have a SCSI *port* (a place for connecting a SCSI device). All Mac models since then have had at least one external SCSI port plus an internal SCSI connection for a hard disk.

SCSI ID numbers *(Michael Bradley/SA/AN/Chris Allen)*

A SCSI chain can contain seven devices plus the Mac. Each device on the chain gets its own SCSI ID number (also known as an *address)*, from 0 to 6. The Mac itself (which isn't technically a SCSI device itself) is always assigned

ID number 7 and the internal hard disk (if there is one) always gets number 0.

On every Mac since the Plus, you can specify which SCSI drive you want to be the startup device. If you don't do that (and you *can't* on the Plus), the Mac will look first to SCSI ID number 0 (typically the internal hard drive), then try to start from ID number 6, then 5, and on down to 1. Thus an external hard disk that you want the Mac to start from should be assigned ID 6, or in any case a higher ID number than SCSI devices you don't want to start from.

All SCSI devices in a chain must have different ID numbers. If any two have the same number, your system will crash, and you may even wipe out data on one or more hard disks. (It doesn't matter whether you changed the numbers or they came that way.)

Some hard disks allow you to set their SCSI ID numbers with software. This is a terrible idea, because if you crash, it's very difficult to get to the disk and change its number. SCSI ID numbers should always be set with actual physical switches on the hardware. Then, if there's an ID number conflict, your system will crash but you'll be able to turn it off, reset one of the switches and restart.

The best kind of SCSI number switches are dials, because buttons can get bumped and change the number of a SCSI device while it's in use. This is something you do *not* want to happen.

Since the SCSI number switches are in the back (and therefore usually hard to get to), it helps to put the SCSI ID number on the front of each device, where you can see it easily. That way you don't have to root around in the back when trying to figure out what SCSI numbers are unused (and are therefore available to assign to new devices you're adding to the chain). Any sort of sticker will do, but the little square number stickers that come

with Kodak Carousel slide trays look great (and you won't need them for the Carousels, unless you make elaborate. multitray presentations with your slides).

SCSI cables *(AN/SA/RS)*

There are two common types of SCSI connectors—25-pin and 50-pin—and thus many possible kinds of SCSI cables—25-pin male to 25-pin male, 25-pin male to 25-pin female, 25-pin male to 50-pin male, etc., not to mention all the various lengths.

The industry standard is the 50-pin connector, and most SCSI manufacturers keep to it, which means you can use one basic cable to chain different devices together. But, to save room, Apple uses a 25-pin connector on the back of the Mac. (They do use the 50-pin connector for their internal hard disks, but even here, their implementation of the interface isn't standard. The PowerBooks use a third type of SCSI cable; it has an almost square, 30-pin connector that conserves space on the machine's small back panel.)

Most hard drives come with a 25-pin to 50-pin cable (called the *system cable)* for hooking up to the Mac directly; if yours doesn't, you'll need to buy one. The standard 50-pin to 50-pin SCSI cable is sometimes called the *peripheral cable.*

Most SCSI cables are about three feet long; you can get longer ones, or attach expanders to the standard ones, to get noisy drives out of earshot. But remember not to go over eighteen feet (less is better).

If possible, always use the same brand, length and style of cable throughout your entire SCSI chain. Cables from different manufacturers and even different styles from the same manufacturer have varying types of construction, impedance and wire placement. Mixing cable types

is one of the most common sources of seemingly incurable problems. (Sometimes you can get everything to work by switching devices and cables around, but it's best to avoid that hassle if you can.)

Always use double-shielded *(foil and braid)* cables, and make sure each connector hood (also called a *shroud)* is connected to the shield braid. (You don't have to understand all these terms, as long as the person selling you the cable does.) Never use RS232 printer cables—which look just like SCSI cables—in SCSI chains.

terminators *(AN/SA)*

A *terminator* is a little piece of hardware that usually looks like the plug at the end of a SCSI cable, except with no cable attached to it. Sometimes it looks like a tiny comb stuck into a board inside a drive, and it may even take the form of a rotary switch or button.

Whatever it looks like, a terminator keeps signals from echoing back and forth along the SCSI cabling, which can cause errors. The faster a Mac is, and the more devices there are attached to it, the more important termination is.

Here are the standard rules about termination: Every SCSI chain needs one or two terminators. Internal hard disks are always terminated at the factory, so if that's all you have in your SCSI chain, you're set. But if you have more than one SCSI device, you must have a terminator on the first and last devices in the chain (not counting the Mac) and no terminators between them. (This means the first and last devices *in the actual, physical chain*—the one nearest the Mac and the one farthest away—not the ones with the highest and lowest SCSI ID numbers.)

Since virtually all stand-alone SCSI devices have two SCSI ports on the outside of the case, and since all the devices in the middle of the chain will have both jacks

filled, the simple rule is: if a jack doesn't have a terminator in it, plug one in.

The problem with that simple rule is that some devices—many hard disks, for example—come with termination already built in. The manual should tell you whether or not that's the case, but given how wretched most manuals are, it probably won't. If it doesn't, give the company a call to find out. Apple now recommends that manufacturers not use internal termination.

According to the engineering department at MicroNet (one of the best hard disk manufacturers), there are some exceptions to those standard rules. If a SCSI chain is eighteen inches or less, it's generally best to terminate just one end. And if it's more than ten feet (as it usually will be if there are three or more devices in it), it should be terminated in the middle as well as at each end.

Some devices also have a switch on the outside that lets you turn termination on and off. This should be standard equipment on all SCSI devices.

The fx is extremely vulnerable to bad termination. You must use the fx's special black external terminator at the end of the SCSI chain, and no device in the chain, including the last one, can be internally terminated. However, if that last device has a 25-pin SCSI socket (like the one on the back of the Mac itself) rather than the more standard 50-pin socket, you're SOL (seriously out of luck). You need part number ¿∞#≠*£, the 25-pin fx SCSI terminator. It's over there in that bin, right between the sky hooks and the peace dividend.

Can't find it? That's not too surprising, since Apple neglected to make them (they don't make 25-pin terminators for other Mac models either). You'll have to dangle a 25-pin-to-50-pin SCSI cable (or adapter) off the back of the device and attach a 50-pin fx SCSI terminator to that. Not too elegant, but at least it works.

✎ *chaining SCSI devices* (C.J. Weigand)

Chain more than a few SCSI devices together and you're bound to run into problems. The types of devices installed, the way they're terminated, the order in which they're hooked up, the SCSI addresses assigned to each device and the total length of the interconnecting cables all play a role in determining whether or not the system will function properly. (For a supposedly standard interface, SCSI needs a lot of work.)

Some devices won't work correctly if they're installed in the same chain. For example, if you use a tape drive for periodic backups, don't also try to hook up a removable hard disk drive. Apple, in its infinite wisdom, designed SCSI with only one backup channel and both types of drives are considered backup devices. If you connect both, only one will work.

Even if both drives appear to be working, you'll discover, probably too late (as I did), that one of them really isn't doing the job. I thought I'd backed up my hard disk successfully on tape, but found when trying to restore information from the tape to the disk that no files were visible or accessible, even via MacTools. Then I tried a different arrangement of the drives. The result? Only half a backup was made before the tape froze in the drive. A third arrangement resulted in the removable-media drive not even appearing on the desktop.

Contrary to theory, some SCSI devices function properly only if connected in a certain order; at least one tape drive manufacturer requires their unit to be at the other end of the chain from the Mac. So you may have to experiment a bit to hit upon a satisfactorily working combination. If all else fails, sometimes changing a SCSI address to a higher or lower number can get a balky drive working again. Make sure no two devices are assigned the same number, though, or you might wipe out the contents of both disks.

Some SCSI devices come terminated but, as mentioned above, only the first and last in the chain should remain so. If you want to use an internally terminated device in the middle of a chain, you'll have to remove the termination.

Generally, you have to open the case and lift out the internal mechanism to get at a device's terminating resistor, a job best reserved for a qualified technician. If you're fearless enough to try it yourself, however, you should know that terminating resistors are usually burnt yellow or robin's-egg blue. Most are socketed and snap out easily, although you'll occasionally find one that's permanently soldered in place.

If you use too much cable, you'll experience the same kind of problems improper termination can cause. The total cable length, from the back of your computer to the last device in a SCSI chain, shouldn't exceed eighteen feet (to be extra-safe, fifteen feet).

Officially, the standard is seven meters (about 23 feet), but that's a dream. The longest length that's actually OK seems to vary slightly according to the type of cables, connectors and devices used. In my experience (I generally have all SCSI addresses in use with a variety of devices), it usually turns out to be about eighteen feet, but I lost the chain once with as little as fifteen feet.

[If you do need to have a long SCSI chain, see MicroNet's recommendation in the previous entry.—AN

Another way around this problem is to buy repeaters *(signal amplifiers).—RS*

For more about repeaters, see the networks *section of Chapter 17. But just to put this in perspective, as I write this, I have four SCSI devices chained to a fussy fx. God only knows the total length of the cables connecting them all, but all I have is a regular fx terminator at the end of the chain and I've had no prob...zzzzfrzzwhzz CLUNK.—AN]*

When experimenting with different SCSI arrangements, be sure to turn off all power before you connect or disconnect cables. If you do it with the power on, you can get transient voltage spikes that can damage the equipment.

when SCSI devices won't boot *(SA/RS/Chuck Meyer/AN)*

If you start your system and one or more of the SCSI devices you have hooked up doesn't *boot* (appear on the desktop), it's usually due to one of these problems:

- One (or more) of the devices in the chain isn't turned on (for more on this, see the next entry).
- Two or more of the devices share the same SCSI ID number.
- The chain is improperly terminated.
- The total cabling is too long.
- Something's broken—a SCSI device, a cable or a terminator.
- The driver on one of the devices, or the formatting software that installed it, is incompatible with other hardware or software. (This is especially common when you upgrade to System 7—be sure to update the driver for your hard disk to a System 7-compatible version before you install.)
- You've had a drive crash which damaged the driver or boot block on one of the drives.

Utility programs like SCSI Probe or SCSI Tool (described in the *SCSI utilities* entry below) can sometimes help you *mount* devices. (*Mounting* a disk simply means making the Mac realize it's there. That's *all* it means, you pervert.)

If your chain includes an Apple scanner, there are some special considerations—not the least of which is that you may need new ROM for the scanner. See the graphics chapter for more details.

The extensions (or, under System 6, inits) that are used with many SCSI devices can also cause problems.

If your system runs too low on memory or if the extensions clash with one another, that can prevent a SCSI device from mounting. (For more on how to manage extensions and inits, see Chapter 7.)

❦ *all SCSI devices must be on...maybe* (SA/AN/Chris Allen)

In general, every device that's connected in a SCSI chain must be turned on or the whole chain won't boot. But there *are* some circumstances when you can leave a device off.

Sharon experimented with a SCSI chain of a Mac IIcx, an Apple internal hard disk, an Apple CD-ROM drive, a DaynaDrive and an Apple scanner—in that order. With the scanner off, everything else still worked. With the DaynaDrive off, she couldn't access the scanner but the CD-ROM still worked. With the CD-ROM off, she couldn't access the DaynaDrive or the scanner.

That led her to assume that you simply can't access anything on the chain beyond the turned-off device...but then she reconfigured the chain as follows: IIcx, internal hard disk, DaynaDrive, CD-ROM and Apple scanner. Now she could access the other devices even when the DaynaDrive was off.

Chris Allen says that if a SCSI device is properly designed, you should be able to turn it off without it interfering with the other devices on the chain. In any case, the simple approach is just to hook up all your SCSI devices to one surge suppressor and always turn them on together.

❦ *SCSI utilities* (SA/RS/AN)

There are a number of utility programs that can be helpful when you're using SCSI devices. Three shareware utilities—Robert Polic's SCSI Probe, Bob Easterday's SCSI Info and Paul Mercer's SCSI Tool—tell you which ID

numbers are assigned to which devices in a chain and let you mount and unmount devices.

very good feature

SCSI Probe also tells you who manufactured the device and even what version it is; Arthur has been using this program for years and loves it. SCSI Info provides a lot of diagnostic information about your SCSI chain and hard drive(s); it's Randy's favorite.

William Long's SCSI Evaluator does a lot of pretty technical things, like check the performance of your SCSI drive and chain. You get a 100-page manual when you pay your $20 shareware fee.

using SCSI drives made for PCs *(RS)*

SCSI hard drives are becoming increasingly common in the DOS (IBM PC and compatible) world. A lot of them are designed to be used with a SCSI controller card in the computer itself (instead of in the box that houses the drive); they won't work with the Mac, because it doesn't contain a SCSI card. But if the drive does contain its own SCSI card, only two things are necessary to make it work with a Mac—a connecting cable and driver software.

When you try to connect a non-Mac hard drive to a Mac, you'll immediately notice that the connector on the back of the Mac uses a 25-pin connector, instead of the standard 50-pin SCSI connector. So the cable that came with the drive won't work, and you'll need to get a Mac *system cable* (see the entry on cables above). For internal drives, you'll also need to get the appropriate Mac-specific cable.

Hard drives specifically made for the Mac come with driver software installed on the drive or on a separate floppy. A drive made for a PC naturally won't have that. However, several good universal hard-disk formatting programs are available, notably La Cie's Silverlining and FWB's Hard Disk ToolKit, and should make any SCSI drive work with a Mac.

Floppy disks

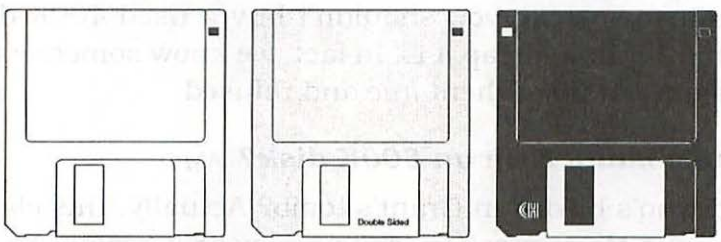
floppy disks and drives *(SA/RS/Hal Lewis)*

mostly for beginners

The Mac has used three types of floppy disks, each capable of holding a different amount of information: 400K *single-sided* disks use only one side of the disk; 800K *double-sided* disks use both sides of the disk; 1.4MB *high-density* disks use both sides and pack the information more tightly.

How can you tell these different types of disks apart? 400K and 800K disks look basically the same, but most of the latter are marked *800K* or *Double-sided* on the metal shutter or on the back.

High-density disks are easy to identify. In addition to the *locking hole* (described below) that all Mac disks have in the upper right corner, there's another hole in the upper *left* corner; unlike the locking hole, this left-hand hole has no sliding tab. In addition, high-density disks usually have a stylized *HD* symbol on the metal shutter or in one corner of the disk.



Typical 400K disk Typical 800K disk Typical 1.4MB disk

There are three kinds of floppy drives to match the three types of disks. The high-density, 1.4MB drive is called the SuperDrive. The 400K and 800K drives are called simply that.

mostly for beginners

Each of these drives can read disks up to its own capacity—so 400K drives can read only 400K disks, 800K drives can read 400K and 800K disks and SuperDrives can read 400K, 800K and 1.4MB disks. (For an exception to this, see the entry below titled *1.4MB disks initialized as 800K.)*

The SuperDrive can also read 3.5-inch floppies from IBM PCs running MS DOS. As of this writing, using DOS disks requires either file translation software or a program like AccessPC from Insignia Solutions ($100 list) that mounts the DOS disk directly onto your desktop.

things to come

By the time you read this, Apple will probably have already introduced its own software that lets you mount DOS disks from SuperDrives, and will be including it as part of the system software.

All current Macs come with SuperDrives built in. 800K drives aren't being made any more, but there are still a lot of Macs around that use them (unless they've been upgraded)—the Pluses, some older SE's and original Mac IIs.

400K drives are obsolete; unless you're running a very primitive system, you shouldn't buy a used 400K drive no matter how cheap it is. In fact, we know someone who was offered 20 of them *free* and refused.

how many K on an 800K disk? *(AN)*

gossip/ trivia

And who's buried in Grant's tomb? Actually, this classic Groucho Marx question isn't as easy as it seems. No one is *buried* in Grant's tomb; the remains of General Grant *and his wife* are in sarcophagi (stone coffins) *above* ground.

Once initialized, 800K floppy disks have a total capacity, for both visible files and invisible ones like the directory and desktop, of 819,200 bytes, or *exactly* 800K. The 1.4-meg floppies have a total capacity of 1,474,560 bytes, which is equal to 1.41 megs.

caring for your floppies *(SA/RS/AN)*

You spend a lot of time creating the information on a disk. It's silly not to take some basic precautions to make sure it stays there.

- Don't open the metal shutter; that lets dust in.
- If you do open the metal shutter *(Why are you doing this? We just told you not to),* be sure to keep your fingers off the medium that's just inside.

- Don't use a disk (or a drive) that has just come in from the cold or that's been sitting in the sun. Wait for it to reach room temperature before using it.
- Keep disks away from magnets and magnetic fields. (For more on this, see *floppy disks and magnets* later in this section.)
- To remove the gunk that accumulates on the read/write head (and causes disk errors), use a cleaning disk regularly (3M and Curtis make good ones; follow their recommendations). *[I've personally had to repair several floppy drives that never would've had a problem if they'd been cleaned regularly. I've been told that Apple recommends this treatment only for SuperDrives, but personal experience has taught me otherwise. The stuff floppies are made of isn't much different from what recording tapes are made of, and the signal deteriorates dramatically on those when you don't clean the heads on your tape recorder or VCR often enough.—RS]*

floppy disks and magnets *(SA/DC/Chris Allen/RS)*

Because information is stored on disks magnetically, magnets placed near disks can hopelessly scramble that information. We're not just talking about the horseshoe-shaped magnets kids play with, or the ones you use to stick postcards and notes onto your refrigerator. Anything with a speaker has a magnet in it; this includes your phone as well as your stereo.

Usually phones aren't a problem, but they can be, especially the old AT&T models (they have strong electromagnets in them to make the bell ring). Since the bottom of the case is metal, the entire phone becomes an electromagnet, so it's not a great idea to set one of these on top of a floppy disk.

Paper-clip dispensers and some executive desktop toys contain magnets, and Tensor lamps and electric motors generate magnetic fields. The ImageWriter I has a magnet underneath the left side of the cover. The cover of the ImageWriter II has a much smaller magnet on the right side, but since the surface is slanted, disks will probably slide off if you try to put them there.

Then of course, there's always the magnet you can't anticipate. Sharon knows someone who stored seldom-used disks in the bottom drawer of a metal desk. After a few months, they became unreadable, although disks stored for only a few weeks were fine. It turned out that the heavy-duty vacuum cleaner used by the office cleaning staff had a very large magnet in its head to pick up paper clips from the carpet. Weeks of that vacuum head coming in contact with the metal finally magnetized the desk, and then the disks.

That said, the threat of magnets to floppies is often overrated. Randy has ruined an audio cassette by setting it down on the magnet of a speaker *[you'd think he'd know better—AN]*, but when he did the same thing several times with floppies, there was no damage at all. This doesn't mean you should be cavalier about where you put your floppies, but you don't have to be compulsive about it either. On the other hand, the floppy that contains your most important data will be the one that gets ruined when you set it down on top of your hard drive, right where the power supply creates a magnetic field.

✎ *disks are tougher than you think* (SA)

All the above advice notwithstanding, disks can take most of what you dish out. When I got my first Mac, my younger son was two years old. While I worked, he often amused himself with disks—stacking them, knocking them over and even giving them an occasional Frisbee toss. I never had a problem with any of the disks—except, perhaps, for *finding* them when they wound up under the couch.

Even as I write this, I have a stack of floppies right next to the telephone—sometimes there's one on or under the phone. I've never had a problem from that either.

[Polaroid will recover the data from any damaged floppy disk of theirs at no charge!—RS]

That's almost reason enough right there to buy Polaroid disks.—AN]

✎ *airport X-ray machines* (Lyn Cordell/AN)

The X-ray machine your luggage goes through at an airport security check emits "very low" levels of radiation—less than a TV. And the machine is unlikely to be out of adjustment, because the FAA requires people who work with these machines to wear radiation-detection badges which are turned in each month to check for leaks.

According to the security personnel at Oakland Airport (and at every other airport where we've asked), these X-ray machines won't damage computer disks. The same can't be said of the metal-detecting gates people pass through (the ones that beep because you forgot to take your keys out of your pocket). So a disk in your pocket is at a *lot* more risk than a disk in your luggage.

The safest thing may be to put your disks on the table provided for hand inspections. But, if you do that, be sure to keep them as far from the metal detector as possible. All in all, the simplest thing is probably just to keep your floppies in your suitcase.

storing lots of floppies (AN)

The plastic disk files that are convenient for storing dozens or scores of floppies get unwieldy when you have hundreds of floppies. You begin to feel that the jumble of disk files all over your office could use a filing system of its own ("which of these damn boxes is that disk in?"). Bigger plastic disk files don't really do the job, both because they don't come big enough and because the inherent flimsiness of plastic begins to matter more and more the bigger the storage unit gets.

Well, there's a solution to this problem (and it's just the sort of unique, innovative tip you'll find *only* in *The Macintosh Bible).* Back before computers, there was a thing called a *tabulating card.* I think it's the same kind of card you weren't supposed to fold, spindle or mutilate (and which therefore inspired the wonderful Free Speech Movement slogan, *Do not fold, spindle or mutilate ME).*

In any case, the metal files in which these tabulating cards were stored have drawers whose internal dimensions are about 7½" wide by 3½" tall—just perfect for two rows of Mac floppies side by side. Since tabulating cards have gone the way of the poodle skirt and the Edsel, there are usually lots of tabulating card files available, in many different capacities, at used office furniture stores. Get one that has full suspension; it may cost a little more, but it'll be worth it.

Since these files are made of metal, they'll protect floppies from stray magnetism better than a plastic file will (unless you magnetize the metal by leaving a heavy magnet on it). Although the drawers will be deep enough for the floppies themselves, they'll probably be a little shallow for dividers. You'll have to cut down the kind of dividers designed for plastic disk files or improvise something out of cardboard. Still, this is a small price to pay for such a slick and efficient way to store as many floppies as you want.

❦ disks melt before paper burns (AN)

Paper burns at 451° Fahrenheit (whence the title of Ray Bradbury's book). Floppy disks melt at about 160° F (the medium itself, that is—the part that actually holds the data). So a normal fireproof safe can't protect the data on your disks. There are safes designed to keep their contents below 160°, but they cost an arm and a leg.

I have another approach, which is to put a fireproof storage box inside a fireproof safe (needless to say, I only do this for archive copies of important information). I'm not sure this will work but it ought to (if my house burns down, I'll let you know the results). It certainly costs less, since both fireproof safes and fireproof storage boxes (the regular ones, designed for paper) are relatively inexpensive.

❦ a cheaper solution (RS)

A more certain and less expensive (but more time-consuming) approach to protecting disks from fire is to keep multiple backups and store them in different locations (work and home, for example). You can get a Teac tape backup drive from APS for only $600, or a WangDAT drive, which holds 1.2 *gigabytes*, for only $1800 (less than a fireproof safe, which may not be up to the task anyway). SyQuest drives are also inexpensive, as are portable hard drives like those from Liberty.

A macro program will automatically back up your hard drive in the background; just take the tape or cartridge (or whatever) home at the end of the day. If you work at home, find another freelancer—ideally someone who lives in a different neighborhood—and switch backups with her periodically. (For more information, see the section on backing up disks later in this chapter.)

❦ parking your floppy disk drive (RS)

Earlier versions of the System than 6.04 don't automatically *park* the heads of your floppy drive when you shut

down the Mac (parking locks the drive heads securely apart so they can't bang together during transport). If you're using an older System, you should either upgrade to a newer one or get the free utility developed by Apple that autoparks the heads every time a floppy is ejected.

Apple no longer distributes this utility—they think you should upgrade to a newer system with this feature built in (and they're right). But if you have a specific reason for using an older version of the system, you may still be able to get the autoparking utility from a user group.

very good feature

Parking the heads every time a disk is ejected, rather than just when the Mac is shut down, cures the previously widespread problem of the heads accidentally getting bent when a disk is removed from the drive. That's why it's highly recommended that you upgrade at least to version 6.04.

when to buy an external SuperDrive *(SA/RS)*

If you have an internal SuperDrive, you'll never need a second, external one—especially since you can buy a good 105-meg external hard disk for about the same amount of money. If you don't have an internal SuperDrive, you should buy an external one only if you need to read 1.4MB Mac disks (which aren't yet the standard) or the 3.5-inch disks used on IBM PCs and compatibles. (For more about reading non-Mac disks, see Chapter 17.) Applied Engineering's 3.5 Plus Drive ($450 list) even works with early Macs like the Plus, early SE's and Mac IIs.

reinitializing disks *(SA/AN/RS)*

When you insert a used floppy that's been damaged into a drive, or a formatted 1.4MB floppy into an 800K drive, you'll sometimes get the dialog box that reads, *This disk is unreadable: Do you want to initialize it?* (Apple's punctuation sure is weird) or one that begins, *This is not a Macintosh disk.* Think twice before you initialize, because any

information already on the disk will be truly erased (wiped clean, not merely removed from the directory file) and file-recovery utilities won't be able to find it.

When you're ready to re-use a floppy, use the Special menu's *Erase Disk* command, even though that takes longer than just dragging the disk's contents to the Trash. Erasing the disk reinitializes it and causes the Mac to check that the entire disk is in good working order. (When it's not, you get the *initialization failed* report.)

A bad floppy takes longer to initialize under System 7 than under System 6, because instead of simply reporting that initialization failed, the Mac creates an invisible map of the bad disk sectors and locks them—making the rest of the disk usable (although with slightly less capacity). If you're still using System 6, Giuseppe Garnevale's shareware init BAD does the same thing (and may do it better, in fact).

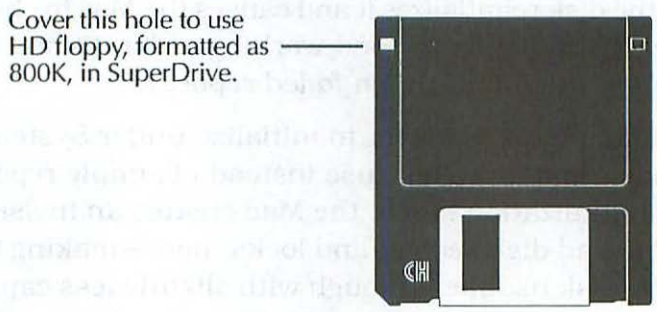
1.4MB disks initialized as 800K *(SA/Chris Allen/RS)*

High-density (1.4MB) floppies use a finer iron oxide dust than regular floppies, and SuperDrives use lower magnetic power to read and write to them. This makes them less reliable than 800K floppies.

800K drives can't detect when a high-density floppy has been inserted and will format it as an 800K floppy. The disk will work fine...in other 800K drives. But if you put it in a SuperDrive, the Mac won't recognize the formatting and you'll get a *This disk is improperly formatted for use in this drive. Do you want to initialize it?* dialog box. (This comes as an unpleasant surprise to those of us who were used to 400K disks being read in 800K drives without any problem.)

If you need the information from a disk that's been formatted in this way and there's no 800K drive available, you can fool the drive by using tape to block the

hole in the upper left corner of the disk. Consider this a temporary fix only—the tape's bound to come off sooner or later, and Murphy says it will come off in the drive. *[I suggest you only try this in an emergency. Putting tape—or anything that might come off in the drive—on a floppy is just asking for trouble.—RS]*



You can try to reformat the disk as a 1.4MB, but since 800K drives use more magnetic power, a SuperDrive won't be able to thoroughly erase the disk and it's likely to be *much* less reliable. So—*don't mix 800K and high-density floppies.*

reinitializing 400K disks as 800K *(RS/SA)*

The difference between 800K (double-sided) and 400K (single-sided) disks is that one side of a 400K disk either failed the manufacturer's quality control tests or wasn't tested at all. Even so, System 7 or BAD (discussed in the *reinitializing disks* entry above) let you reliably reformat new 400K floppies as 800K disks, because any bad sectors will be locked in the process. Randy knows several people who do this regularly and they've never experienced any problems.

But it doesn't make sense to buy *new* 400K floppies and reformat them to 800K. There's no longer a significant price difference between the two sizes, and the 400K floppies may not format to a full 800K. Anyway, new 400K disks are hard to find.

400K disks that have already been used in single-sided drives are extremely difficult to reformat as double-sided. That's because the unused side of the disk has been pressed—and usually damaged—by the single-sided drive's pressure arm. If you're using System 7 or BAD, you may be able to make them usable, but you'll rarely get the full 800K, and we wouldn't trust such a disk. If you're looking for cheap floppies, a better deal is to buy 800K floppies in lots of 25 for only 35¢ each from MEI/Micro Center.

✎ *floppies with items that are "in use"* (JK)

Sometimes, when you drag a floppy to the Trash to eject it, you get the message *The disk [disk name] could not be put away, because it contains items that are in use.* This usually happens because a file from the disk is open (or was just open) and its application is still open. Quit any open applications this might apply to and try ejecting again. If the message persists, eject the disk using the Special menu's *Eject Disk* command, and then drag the disk's icon to the Trash.

✎ *the paper-clip trick* (SA/RS/Lyn Cordell)

The tiny round hole to the right of a floppy drive slot lets you manually eject disks by inserting a straightened-out paper clip and pushing firmly. A heavy-duty paper clip is best; you have to feel around for the right place to push.

This is the only way to get a disk out when the computer's off, and it works in *emergency* situations while your computer's on. But don't try this trick while the drive is working—you may damage the disk.

✎ *disks that bomb when you insert them* (SA/RS)

If you get a bomb as soon as you insert a disk, either the disk is bad or its desktop files are corrupted. If there's information on the disk you want to recover, see the

section called *Problems with disks* in Chapter 8. If you don't care about the information on the disk, the methods below may help you erase it and reuse it.

Insert the disk while holding down Option⌘. You'll get a dialog box asking if you want to rebuild the desktop; click *Yes*. If Option⌘ doesn't work, try Tab Option⌘ while you insert the disk. If you accomplish this minor gymnastic feat, you should see the *This is not a Macintosh disk. Do you want to initialize it?* dialog box. Click *OK*.

If *that* doesn't work, insert another (blank or dispensable) disk into the drive. Select it and choose *Erase Disk* from the Special menu. While the confirmation dialog box (*Are you sure you want to erase...*) is on the screen, use the paper-clip trick described in the previous entry to eject the disk. Then insert the damaged disk and click the *OK* button, allowing the initializing to proceed. The Mac won't know you switched disks.

If none of these methods works, or if the initialization fails, your disk is really trashed and you should recycle it as a high-tech coaster.

disks stuck in drives *(SA/AN)*

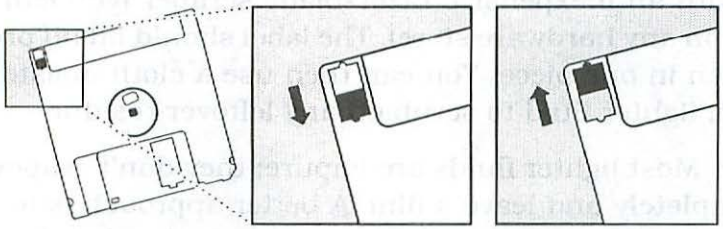
If a disk is *really* stuck in a drive, don't force it. (We know someone who tried to get one out with needle-nosed pliers.) Whether it's a problem with the disk label or the drive's read/write heads, trying to force a disk out is likely to ruin the drive.

A stubbornly stuck disk requires that the drive be taken apart. Your dealer can do it, and probably should, but a knowledgeable and intrepid friend can also come in handy. (Remember—intrepid alone isn't enough. Free help can turn out to be expensive if you end up having to buy a new drive.)

locking disks and files *(SA/RS/AN/Hal Lewis)*

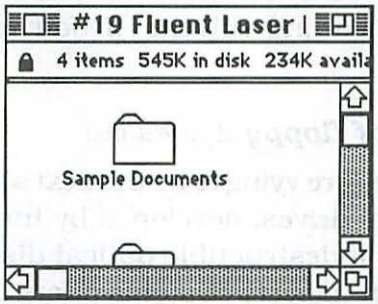
mostly for beginners

To lock a disk so nothing can be changed on it, and so it can't be erased accidentally, simply slide the little tab in the upper right corner so that the square hole is open.



Back of floppy disk Unlocked disk Locked disk

(In a masterpiece of counterintuitiveness, the disk is *locked* when the hole is *open* and *unlocked* when it's *closed.)* A disk that's locked shows a lock (what else?) in the upper left corner of its window:



It's a good idea to lock all your master program disks. To lock an individual file or application just select its icon, choose *Get Info* from the File menu and check *Locked* in the dialog box that appears. For more on this, see the entry on *locking files* in Chapter 4.

removing old disk labels *(C.J. Weigand/Chris Allen/RS)*

CJ: Ordinary lighter fluid will quickly remove old, stubborn labels from your disks without causing damage.

(Even if it seeps inside, it just evaporates. I've even used lighter fluid to clean fingerprints and sticky, dried soft drink off the actual floppy-disk surface itself.)

Saturate the label for a few seconds; then gently remove it with an inexpensive razor-blade scraper (you can get one in any hardware store). The label should lift off pretty much in one piece. You can then use a cloth moistened with lighter fluid to scrub off any leftover residue.

CA: Most lighter fluids are impure; they don't evaporate completely and leave a film. A better approach is to use "stickum" removers available from most art-supply houses that are specifically designed for removing labels and other sticky paper. You don't even have to use a razor blade with these.

RS: Be careful using either of these chemicals; inhaling them, or even just getting them on your skin, can cause serious health problems. Read the label carefully before you use any cleaning solvent. (I had to add this—my wife's a doctor.)

✎ *the future of floppy drives* (RS)

Two technologies are vying to be the next standard in floppy drives. Floptical drives, developed by Insite Peripherals, use practically indestructible optical disks that hold 25 megabytes each. Liberty Systems offers a Floptical drive for $800.

The competing technology, developed by Brier Technology, is *very-high-density* floppy disks. They're magnetic, like regular floppies, not optical, but each disk holds just over 20 megabytes. Quadram's Quad-Flextra ($500 list) is one brand that can also read 1.4MB and 800K floppies.

CD-ROMs

CD-ROM drives *(AN/ND/Chris Ferino)*

CD-ROMs *(compact disk, read-only memory)* are a particular kind of compact disk. CD-ROM drives are the most common—and cheapest—optical storage available for the Mac. Depending on how they're formatted, they can hold about 550–600 *megabytes*, which is equivalent to more than seven hundred 800K disks and well over a quarter of a million typewritten pages.

As their name implies, you can only read CD-ROMs—you can't change them or add any new information. There's another little problem—CD-ROMs are *s-l-o-o-o-w*. Hard disks can usually access a particular piece of information in 5–30 milliseconds (thousandths of a second), while even a fast CD-ROM drive takes 350 milliseconds.

Because of that (and perhaps for some other reasons as well), CD-ROM drives haven't really taken off yet. That's too bad, because a lot of useful information now comes on CD-ROMs. You'll find reviews of some of it throughout the book (for example, some clip-art CD-ROMs are reviewed in the graphics chapter).

shopping for a CD-ROM drive *(ND/Chris Ferino)*

Here are some other things to look for when shopping for a CD-ROM drive:

- Does the drive come with everything you need to run it with a Mac? Some manufacturers sell the cables, and even—incredibly—the required drive software, separately. Make sure the prices you compare include *everything* you need.
- If you're networked with other computers, does the drive include software that lets you share the drive with others on a network, or will you have to buy separate software like DriveShare from Casa Blanca Works ($140 list)?

- How fast is it? Compare the average access speeds of drives you're considering and then do a test in the store: load a big file, say a HyperCard stack of several megabytes, and time each drive.
- How easy to use is it? Does it have a power indicator of some kind or do you have to figure out by trial and error whether it's on? Can you set its SCSI address easily?
- Does it give you ready access to audio CDs? Many CD-ROM players let you play your music CDs, but most don't have a built-in pre-amp so you need headphones or an external pre-amp between the drive and your speakers. Some drives have limited volume controls, like a three-level switch (quiet, medium, loud) instead of the dial you might expect. Some have their own software that lets you select CD audio tracks from your Mac screen; others rely on Apple's CD Remote desk accessory software.
- What extras come with the drive, and are they worth it to you? Does it have two SCSI ports on the back or just one? If just one, it has to be at the end of the chain. Are there *audio-out* ports that let you connect the player directly to a stereo system? Does it include additional software (like Microsoft Office software, which you can buy with the Porta-Drive from CD Technology)?

Several manufacturers make CD-ROM drives. Apple's CD150, with a capacity of 656MB, isn't a bad deal at $600 list. CD Technology's light and compact Porta-Drive runs relatively quickly and can be powered by a battery, but it lists for $900, not including the $40 cable and terminator you'll need. NEC makes a portable too ($450), but you'll need to buy the Mac software and cables separately. You can also use the PLI CD-ROM ($700) with a PC.

prolonging the life of CD-ROMs *(C.J. Weigand)*

Although CDs are ballyhooed as being indestructible, don't believe it. The thin plastic coating can be easily scratched and that can cause data to drop out during the

read cycle. Dirt can do the same thing, as can warping of the disk caused by excessive heat.

So keep your CDs out of direct sunlight, away from heat and in their protective cases when you're not using them. It's bad enough to ruin a $15 music CD, but it's a lot worse to ruin a CD-ROM that cost you $200.

❦ CD-ROMs under MultiFinder *(SA)*

If you use a CD-ROM player and MultiFinder under System 6, you'll probably have to increase the Finder's memory allocation so it can handle all the CD's desktop windows. (For how to do that, see the entry *setting an application's current memory* later in this chapter.)

Backing up disks

❦ about backups *(AN/SA)*

There are only two kinds of computer users: those who've lost data and those who are about to. The latter obviously haven't had their computers very long.

mostly for beginners

Since you're *guaranteed* to lose data someday, it's prudent to reduce the *consequences* of that. You can do that to such an extent that losing data is no big deal. For example, if you back up every ten minutes, you can never lose more than ten minutes' work. You can back up "by hand" (by simply copying files to another disk) or you can have a backup utility program help you with the job. Either way, it's worth the time and effort.

❦ same-disk backups *(SA/AN/LA)*

If your hard disk crashes, it's a major catastrophe, because of all the data on it. But it's much more common for a single *file* on a disk to become corrupted (and unopenable, and unrecoverable), because of a system crash or other

and unrecoverable), because of a system crash or other software problem. When that happens, a copy of the document on the same disk is all you need to get going again. *[That's not a safe approach for floppy disks, because they fail more often than any other kind of storage medium. With floppies, you're not really at all safe unless you have a backup on a different floppy disk.—LA]*

Some programs let you automatically make a backup copy of the document you're working on—every time you save it, the previous version gets relabelled as a backup. You should activate this feature in any program that has it; in programs that don't, you should get in the habit of saving double copies of important documents by hand—either by using *Save As* from within the application or by duplicating files on the desktop at the end of each work session.

Other files you should remember to duplicate (because redoing them can take so much effort) are the little ones in your System Folder, like the user dictionary your spelling checker creates, the file a macro utility uses to store your macros and so on.

how many backups to make *(AN)*

A floppy disk typically costs less than a dollar and holds at least 25 hours' work. So if you value your time at more than 4¢ an hour, the moral is simple: you should always have enough disks around to make multiple copies of your work.

I make two copies (plus the original), each on a separate disk, of every piece of work I do. Tony Pietsch got me into that habit years ago, when he described the following scenario: *Let's say you only have an original and one copy of something and your disk drive screws up. You insert the first disk and see garbage on the screen. Naturally you assume there's something wrong with that disk, but you're not worried, because you have a second disk*

with the same document on it. So you insert the second disk and the drive zaps that too. At that point you realize the problem is with the drive, not the disk, but it's too late—unless you have a third copy.

off-site backups *(C.J. Weigand)*

I second what Arthur just said. Two backups let you recover from losses caused by program crashes, system crashes, undetected errors, viruses or disk failure. (The shelf-life of a diskette is two to three years at most and the potential for random media problems can increase dramatically as time goes by.) If you really want to be safe, rotate in a third backup and keep it in a separate building, so you can recover your files even if you suffer a fire or burglary.

more backup tips *(PH)*

If your Mac is on a network, you might consider backing it up by copying to unused space on the hard disks of other computers. For example, if you're networked to a minicomputer with a large hard disk, filling up 20 megabytes may be perfectly acceptable to the system administrator. This is usually *much* slower than backing up to floppies, but it doesn't cost anything since no floppies are used.

Whatever method you use, be sure to label your backup disks, cartridges or folders with the complete date of the backup, including the year. Since it's likely that you'll own your Mac for more than a year, finding information on old backups is almost impossible otherwise.

what not to back up *(SA/ND)*

SA: You don't have to back up everything on your hard disk. Why waste your time backing up a few megs' worth of fonts in the system folder when you have the master disks stored safely away? (You *do* have them stored safely away, right?) There's no need to back up applications, either, since you've got them on master floppy disks.

Concentrate your efforts on backing up files that don't exist anywhere else—the documents that you create yourself.

ND: I don't agree that it's a waste of time to back up things in your system folder. Think of all the hours it took you to customize your setup. Do you want to do that over again? Many applications have preferences that you've selected over time (like curly quotes or default font in Word). When your hard disk has crashed, you're already in a bad mood; you don't need the added irritation of finding you're in the wrong font when you finally get back to work.

backup media *(SA/ND/AN)*

Since backing up the contents of floppy disks is simply a matter of putting a copy of each file on at least two different floppies, the rest of this section assumes that you're backing up from a hard disk. You can do that onto floppies, another hard disk, a removable cartridge, a tape or a rewritable optical disk.

Floppies are the least expensive, but backing up a full 40-meg hard disk requires about *fifty* 800K floppies—just think of the time it will take. And that's if you make only a single copy; if you're really careful, you'll make two backups, which means 100 floppies.

Of course, you don't usually have to back up the whole hard disk at once. And, yes, you could cut down the number of floppies by using high density ones. But you might also have a much larger hard disk than 40MB. The bottom line is, unless you figure that your time is essentially worthless, floppies are a tedious and expensive backup medium.

Removable hard-disk cartridges are probably the most popular backup medium. (For more about them, see the entries called *portability* and *SyQuest cartridges* in the *hard disks* section above.) A removable-cartridge drive can also do double duty as your regular, everyday hard disk (just back up from one cartridge onto another).

When you decide on which sort of backup device to use, remember to compute the price of the medium. For example, a SyQuest drive may be cheaper than an optical drive, but SyQuest cartridges cost more per megabyte than rewritable optical disks.

backup strategies *(SA/ND/AN)*

You can back up simply by dragging files from one disk to another in the Finder. But backup programs automate the process and make it easier and more certain. A good backup program should be reliable, fast and capable of splitting large files across two disks (if you're backing up onto floppies). It should also give you a choice of global, incremental and archival backups.

A *global* backup makes a mirror image of the information on your disk. An *incremental* backup only backs up the files you've modified since the last time you backed up (or from any date you specify). An *archival* backup saves the previous versions of your documents, so you can go back later and retrace your steps. Most backup programs insist on doing an initial global backup and then let you choose to back up just the files you want.

Some backup programs compress files when they back them up. This makes them work more quickly and efficiently, but it means that the same program has to translate the file on its return trip—you can't just insert the backup disk and drag icons back to the desktop.

There are dozens of backup programs available. Some used to be awkward and hard to figure out, but most are pretty good now. Four of our favorites are described in the next two entries.

Redux and DiskFit Pro *(SA/AN)*

Redux ($100 list) is a terrific backup utility from Microseeds. It does incremental backups and lets you specify that only certain *types* of documents (Excel spreadsheets,

say) be backed up. Redux writes to most kinds of media—floppies, hard drives or cartridges. Its manual is friendly and understandable.

As for the name, somebody at Microseeds was obviously an English major. For those of you who weren't, *Rabbit Redux* is the name of a book by John Updike. *(Redux*, by the way, means *brought back* or *returning*. A less pretentious author might have called the book *The Return of Rabbit* or *Rabbit Returns.)*

DiskFit Pro ($125 list) does pretty much what Redux does, and makes backing up idiot-proof. All you have to do is write the labels for the backup disks.

Fastback Plus and Retrospect *(SS/ND)*

Both Fastback Plus from Fifth Generation ($190 list) and Retrospect from Dantz Development ($250 list) can back up to tape drives as well as floppy disks, cartridges and rewritable optical disks. (If you're planning to back up to a tape drive, make sure the backup program supports the model you have.) Retrospect is a little faster and slightly more convenient than Fastback, but they're very similar.

Both programs:

- run in the background (under System 7, or in MultiFinder under System 6), so you can do other work while you back up—as long as you don't open anything on the drive being backed up.
- will back up your drive at a later time, while you sleep or eat dinner or go to a movie—as long as your backup drive has enough room on it without having to change disks.
- let you archive files—compress them, copy them to another disk and then remove them from the original disk.

Retrospect Remote ($450 list) lets you back up ten Macs at a time over a network onto a single storage device. You can add more users at a cost of $250 for each additional ten.

HD Backup (SS)

Apple used to provide the HD Backup utility free on its System Tools disks. Unfortunately, it was a case of getting what you pay for. HD Backup is slow and clumsy, and it only works with floppies.

I mention this obsolete program only because using it may have discouraged you so much that you never developed good backup habits. Well, try a real backup utility instead—any of the four mentioned above. They make backing up so easy to do that you might actually do it.

mirroring (SS)

The most convenient backup method is to set up a second drive to *mirror* your primary drive, so every change takes place on two drives at once as you work along. You can do this with a utility program called TwinIt ($200 list) or the DiskTwin card and software package ($1000 list), both from Golden Triangle.

Mirroring makes backing up completely automatic, but it means that you have to devote a second drive of the same size to nothing but backing up. It's also not as safe as backing up at the end of a work session, since if you throw away a file by mistake, it's gone from the backup drive too.

back to square one (AN)

I've used many different backup programs, some of which worked just fine, but in the fullness of my years, I've come back to the simplest method. When I quit whatever application I'm working in and return to the Finder (or when I finish working for the day), I simply drag the new documents I've worked on over to my removable-cartridge drive. That's it.

Once every several months, I do a full-disk backup (just documents, not programs) to catch any files I may have

missed. For that I just make a copy in the Finder, by dragging as many folders as will fit over to the cartridge, then putting in another cartridge when that one is full.

[I'd recommend a tape drive instead. I've wiped out everything else—disk drives, motherboards, fax modems, cartridge drives—but I've never wiped out a tape backup. Apparently that's because the tape drive cleans the tape as it goes about its business. I swear by my tape drive; it's more reliable in my dusty Arizona home than a cartridge drive would be.—SS]

Yes, Steve, but readers should realize that tape backups aren't SCSI devices and don't show up on the desktop. You have to use arcane commands to access them. It's almost like having a PC hooked up to your Mac, and when you try to tell it something, it says, *Hunnh? Whut?*

Memory upgrades

how much memory do you need? *(AN/RS)*

We're approaching the day when one paltry meg of RAM will barely be enough to use most basic word processors (which doesn't include Word 5, for example), simple graphics programs (certainly not color ones), spreadsheets and the like—one application at a time. If you're running System 7, you'll definitely want four or five megs of RAM, *minimum*. If you're running MultiFinder under System 6, you'll need at least two megs to do anything useful, and you'll probably be happier with four or five. If you plan to use heavy-duty page layout, graphics or CAD programs, get as much RAM as you can afford.

memory upgrade basics *(Larry Pina/SA/AN/RS)*

When reading about memory chips, keep in mind that they're sized in *kilobits* (1024 *bits*). Unfortunately, kilobits

are abbreviated *K*, just like *kilobytes* (1024 *bytes)*—the eight-bit units used to measure the computer's total memory. Likewise, both mega*bits* and mega*bytes* are commonly called *megs*. Since there are eight bits to a byte, you need *eight* one-mega*bit* RAM chips to get a mega*byte* of RAM.

Let's begin with a little history: The original 128K Mac contained sixteen 64-kilobit RAM chips—for what, at the time, seemed a whopping amount of memory. A year later, Apple substituted 256K chips and was able to produce essentially the same machine with four times as much memory (512K). In both cases, the chips were soldered (not socketed) to the *motherboard* (the main printed circuit board in the Mac).

Rather than having to desolder and resolder 256 connections (sixteen pins times sixteen chips), dealers took your old board in trade (it went back to the factory to become someone else's upgrade) and sold you a new one. This is called a *board swap*.

To upgrade the 512K Mac, you need a *daughterboard* (so called because it mounts on top of the motherboard). Some daughterboards snap into place without soldering, but they only work with absolutely perfect motherboards; if there's been any previous upgrade or repair work, the snaps may not line up properly.

An important consideration when buying a daughterboard is whether the extra memory is socketed or soldered—socketed is always easier to deal with but soldered is more reliable.

Beginning with the Mac Plus, Apple started supplying RAM chips on tiny boards called SIMMs *(single in-line memory modules)*. Each SIMM has eight memory chips on it (some have a ninth *parity* chip as well, but don't worry about that). When each of the eight chips is 256 kilo*bits*, you have a 256 kilo*byte* SIMM. (Unlike individual memory

chips, SIMMs are measured in kilo*bytes* and mega*bytes*.) When each chip is 1024 kilobits (one megabit), you have a 1024K (one-meg) SIMM.

By replacing the SIMMs that come with the computer with higher-density ones (that is, ones that have more memory on each chip), you can increase the memory in your computer. The Plus, SE and si have four slots for SIMMs. The SE/30 and all the IIs except the si have eight. The Classic has only one slot, but you can increase that to two with an expansion card. The LCII and the Classic II come with two slots.

DRAM vs. static RAM *(SA/RS)*

Most memory chips are DRAMs *(DEE-ram, for dynamic RAM)*. DRAMs need to be constantly powered with electricity to remember what's been stored in them. (That's why you lose the contents of memory when you shut down your computer.)

Static RAM, the kind of memory the old Mac Portable used to conserve battery power, doesn't need to be constantly supplied with electricity, but it's phenomenally expensive compared to DRAM.

The PowerBooks use pseudo-static RAM chips, which are cheaper than true static RAM chips and consume only slightly more power; they're still much more expensive than DRAMs, however. The comparably priced Outbound laptops use the same inexpensive DRAM SIMMs most Macintoshes do, which gives you a big price advantage when you're adding RAM, especially considering that the Outbound's operational time on a single battery charge is similar to the PowerBooks'.

all about SIMMs *(SA/RS/Chuck Meyer)*

It's not hard to upgrade the amount of RAM in a Mac II yourself. It's not even that hard to do it in a compact Mac. You need a special tool to open the case (a Torx T-15

screwdriver with an extra-long shaft) and you have to snip a resistor, but the company that sells you your SIMMs should give you instructions on how to do it. Installing memory yourself can save you a fair amount of change, but be sure to follow all the safety cautions we lay out in Chapter 2; there's no point in getting electrocuted just to save a few bucks.

RAM has gotten very affordable—about $35 a megabyte mail-order. A good place to buy it is Technology Works (a.k.a. TechWorks) in Texas. They're great people, they accept credit cards and, if you ask them, they'll even include the Torx T-15 at no charge.

When you buy SIMMs to upgrade your memory, there are a number of things to consider: size, RAM amount, profile, parity and speed.

The overall size of SIMMs depends on where they're going—into your Mac, into the LaserWriter or wherever—but, in general, they're about 1" x 4". SIMMs for the LaserWriter IIf and IIg and SIMMs for Macs are interchangeable, but be aware that the SIMMs for earlier models of the LaserWriter are different.

Eight kinds of SIMMs are currently available—256K, 512K, 1MB, 2MB, 3MB (only for the Classic), 4MB, 8MB and 16MB. Few 256K or 512K SIMMs are sold anymore; when people upgrade, they buy 1MB chips or better.

How many SIMMS you need depends on the model of Mac you have and its maximum amount of RAM (as well as how much RAM you want or can afford to add). For details, see the entries below on upgrading different types of Macs. You can't mix SIMMs of different capacities within a *bank* (a group of two or four slots, depending on the model of Mac).

The *profile* of a SIMM is something else you need to know about when you add memory. Depending on how the

DRAM chips are installed on the SIMM, it's known as *high profile* (also called a *DIP SIMM)* or *low profile* (also called a *surface-mount).* If you're upgrading an SE, be sure to get low-profile SIMMs—high-profiles are hard to get into the sockets, and even if they go in, they may interfere with the installation of an accelerator (or other) board.

As mentioned above, some SIMMs have a ninth chip that's used for parity-checking (don't worry about what that is). Since the government sometimes requires this ability in the machines it buys, Apple has made it an optional feature on some Macs.

Although you can use parity SIMMs in any machine (the ninth chip will just be ignored if you don't need it), they cost more, so they're normally not the best choice. Only a few ci's actually *require* that kind of SIMM; you'll know yours is one if you see a square chip rather than a vacant square group of solder pads next to where the letters *PGC* appear on the logic board (near the SIMMs).

SIMMs also vary in speed, which is measured in *nanoseconds* (billionths of a second, abbreviated *ns).* SIMMs currently come in speeds of 60ns, 70ns, 80ns, 100ns, 120ns and 150ns. (In this case, the *lower* the number, the faster the chip—since we're measuring how long it takes the Mac to access the memory.)

The Mac Plus was designed for 150ns SIMMs (and thus will take any SIMM you can buy). The SE, SE/30, original Mac II, Classic, Mac IIx and cx require 120ns SIMMs or faster. The LC, si and Mac Portable need 100ns or faster, and the ci, fx and Quadras use 80ns SIMMs. You can always put a faster SIMM into a machine than it requires, but you won't gain any speed by doing that, and the faster SIMMs will probably cost more.

The conventional wisdom is that you can mix SIMMs of different speeds, as long as the slowest one isn't slower than your machine needs. But speed-mixing can

cause random, intermittent crashes, so it's a good idea to avoid it.

If you don't know what speed your SIMMs are, look on the SIMM for some numbers in fine print. Often the last two digits at the end of a string of other numbers indicate the SIMM's speed; *-60, -70, -80, -10, -20* and *-15* stand for 60, 70, 80, 100, 120 and 150 nanoseconds, respectively.

With the proliferation of new Mac models, SIMMs and extended memory packages, it's beyond the scope of this book to list every RAM upgrade option for every model of Mac; we'll only touch on the most common ones here. For an excellent in-depth tutorial on all the Macs, get *The Macintosh Memory Guide* from Connectix. It's available from user groups and on bulletin boards, or you can get it for free on a floppy by calling Connectix at 800/950-5880 or 415/571-5100.

upgrading Pluses and SE's *(SA/RS)*

The Plus and SE each have four slots for SIMMs, and each *pair* you put in must be the same size. So there are only three possible combinations (unless you leave some slots empty—and why should you?):

SIMMs installed	*total RAM*
four 256K	1MB
two 256K + two 1MB	2.5MB
four 1MB	4MB

One pair of SIMMs goes in the first two slots and the other in the back two slots. (If all four SIMMs are the same size, you don't have to worry about this. If you're mixing sizes, however, you can't put one pair in the first and fourth slots and the other pair in the middle slots.)

In the Plus and early SE's, the larger SIMMs go into the front slots and the smaller pair into the back slots. On later SE's, it's reversed—the larger pair goes into the back slots.

For the Plus and SE to use the extra memory, certain resistors—or, in the later SE's, a jumper cable—also need to be cut. You may want to let an experienced person do this for you.

As mentioned above, to upgrade a compact Mac, you need the special Torx T-15 screwdriver. While most Mac dealers charge $20 or more for it, some SIMM suppliers, like TechWorks, provide it free. Or go to a discount automotive supply store and ask for a General Motors headlight adjustment tool; it'll cost you about $3 and will work perfectly.

upgrading Mac IIs and SE/30s *(SA/RS)*

The Mac II, IIx, IIcx, IIci, IIfx and the SE/30 all have eight slots for SIMMs, arranged in two banks of four. All four SIMMs in each bank must be the same size.

You can fill all four slots with just about any size SIMM (as long as they're all the same size), or you can leave all four empty, but you can't fill fewer than four slots in a bank. The fx requires special SIMMs. Some popular upgrade combinations are:

SIMMs in bank A	*SIMMs in bank B*	*total RAM*
1MB	256K	5MB
2MB	256K	9MB
2MB	2MB	16MB
4MB	2MB	24MB
4MB	4MB	32MB

Installing SIMMs in a cx, ci or fx is a cinch—just take off the cover and carefully plug them in. In a II or IIx, you have to take off the cover, detach the floppy drive cables and remove the hard disk to get at the SIMM sockets. For the SE/30's slots to be reached, it has to have its logic board removed by an expert.

fill those empty banks (RS)

Because a lot of 256K SIMMs are left lying around after memory upgrades, you can usually get them for little or no money. So if you have an empty bank of slots in your Mac II or SE/30, you can add an extra megabyte of RAM at little or no cost by filling it with 256K SIMMs.

Check with your local user group (if they do RAM upgrades for members) or with your local Apple repair store. They're sure to have a bunch of 256K SIMMs on hand that they're willing to sell cheaply.

Note that this tip doesn't apply to the fx, which requires special SIMMs, and be sure to keep in mind that the 256K SIMMs you use must meet your Mac's minimum speed requirements. Also, if you mix 256K and 1MB SIMMs on an SE/30 or Mac II to make a total of 5 megs, the larger SIMMs must be installed in bank A—except on a ci where you can install them in either bank (but the ci's built-in video will run faster if the larger SIMMs are in bank B).

Managing memory

from eight megs to a gig (CR/JK)

In the past, the Mac was limited to eight megabytes of RAM, but System 7's 32-bit addressing ups the limit to a gigabyte (more than a thousand megs). Only Macs with 512K ROM chips *and* 68020 or better processors can use 32-bit addressing without an upgrade. Macs with 256K ROMs need Mode32—a program you can copy for free from most Apple dealers that fixes some code in the ROMs. (Some software tricks on the Mac LC will let it use up to 10 megs of RAM, but that's not through 32-bit addressing.)

Applications that are *32-bit clean* (which means they've followed Apple's memory-use guidelines for developers)

will be able to use all this memory right away; those that aren't will still run, but they won't be aware of any memory beyond eight megs.

checking memory amount *(SM)*

mostly for beginners

To check on how much memory a Mac has, choose *About This Macintosh...* (or *About the Finder...* under System 6) from the menu when you're on the desktop and look at the *Total Memory* figure.

increasing available memory *(SA/CR)*

System 7 is a real memory hog, and even if you have eight megs, you may run short once in a while. Here are several ways to free up a little extra memory:

- Go to the Memory control panel and reduce the size of the disk cache to its lowest setting. (You can't turn the disk cache off in System 7, as you can in System 6—where, by the way, it's called the *RAM cache*.) See the next entry for more on this.
- Close unnecessary programs and desk accessories.
- Don't assign more memory than necessary to the programs you have running (see *setting an application's current memory* below).
- Launch frequently used programs first to avoid memory fragmentation (see *memory fragmentation* below).
- Turn it off file sharing if you're not using it—it takes up 250K. (For more information on file sharing, see Chapter 17.)
- Use special utilities inside programs, like a word processor's spelling checker, sparingly. They take up RAM that would otherwise be available for programs or documents.
- Remove unnecessary fonts and sounds from your System file. (For more on the System file, see Chapter 4.)
- Cut down on the number of system extensions in your Extensions folder and the number of control panels in your Control Panel folder. Each one alone usually doesn't take up much space, but together they can add up. (For more on that, see Chapter 7.)

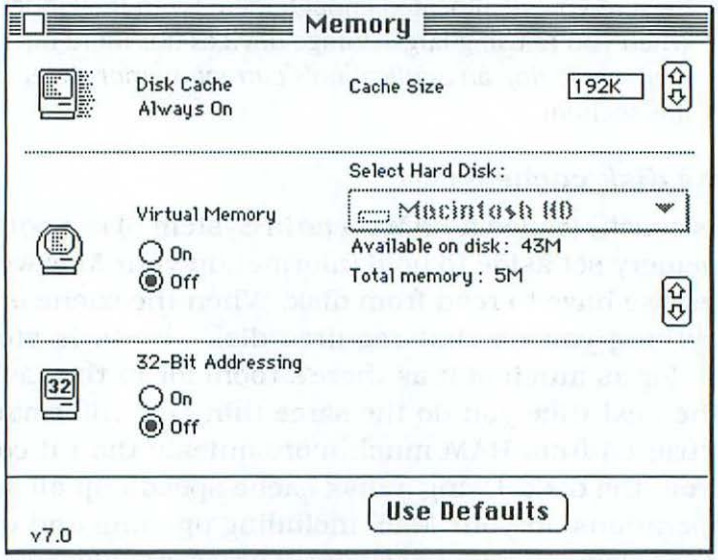
- Be sure you've allocated enough memory to the Finder when you're using large storage devices (for more on this, see *setting an application's current memory* later in this section).

the disk cache *(SA/CR)*

A *disk cache* (called a *RAM cache* in System 6) is a portion of memory set aside to hold information your Mac would otherwise have to read from disk. When the cache is on, everything you do that requires disk access is stored there (or as much of it as there's room for in the cache), so the next time you do the same thing the information is retrieved from RAM much more quickly than it could be from the disk. Using a disk cache speeds up all sorts of operations on your Mac, including opening and quitting programs, loading portions of programs like spelling checkers and switching between active programs.

You can't *assign* things to a disk cache; whatever you do is automatically stored there until you use it again (unless it's been flushed out to make room for other things you've done since).

In System 7, the disk cache is always on, because it takes at least some cache to make the Finder's operation tolerably fast. You can set the cache size from 16K up to a megabyte or more with the *Cache Size* box in the Memory control panel, which is shown at the top of the next page:



Apple recommends a disk cache size of 128K–256K under System 7. If you frequently access large files or programs from floppy disks (or your monitor is set to 256 colors on an si or ci), a cache size of 384K may speed up your Mac's performance. (The si and ci have built-in video, and Apple says setting a larger disk cache speeds up the display.)

Under System 6, you can turn the cache off. To do that, or to change its size, you use the General icon in the Control Panel. The settings you choose won't take effect until you restart your Mac. Here are some guidelines for RAM cache size under System 6:

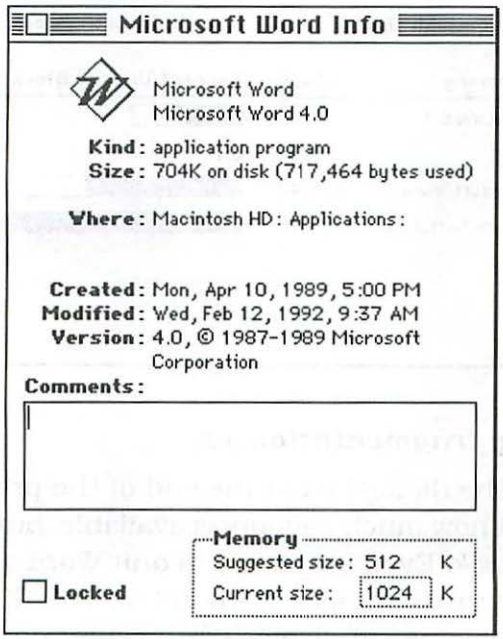
- When you're running under MultiFinder, set 32K of cache for each meg of RAM installed in your Mac.
- When you're not running under MultiFinder, the cache size should equal 25% of your total RAM.

If you want more RAM cache than this, keep in mind that the maximum you can use while in MultiFinder is 348K for each meg of memory you have. If you set the cache higher, it will be automatically reset to 348K per meg.

setting an application's current memory *(CR)*

Under System 7 (and MultiFinder in System 6), each program you run gets its own *partition*—a portion of memory reserved exclusively for that program. Although every program comes with a default partition size assigned to it, sometimes it's not large enough, and in that case the program will either quit unexpectedly or tell you it needs more memory.

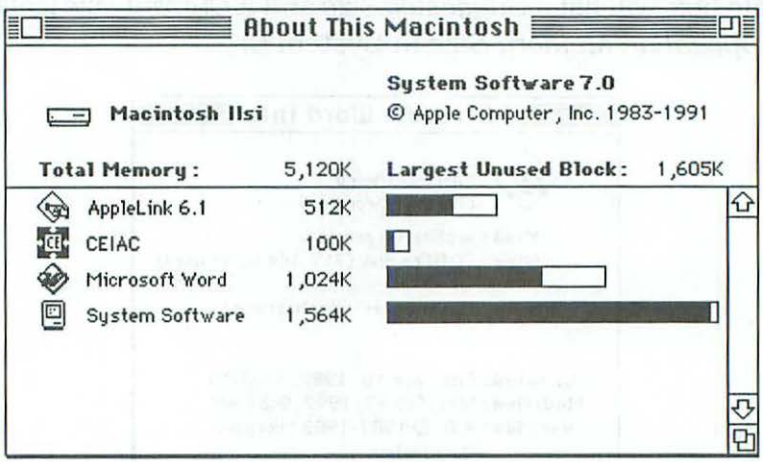
To change the size of the partition, quit the application, select its icon on the desktop and *Get Info* on it (described in the second entry in this chapter). The Get Info box will list a *Suggested size* and a *Current size* (called *Application Memory Size* in System 6).



Unless you've already changed the current size, the two amounts will match. All you have to do is make the current size larger (as shown above) by clicking inside the *Current size* box and typing a new number—try adding 128K or 256K to start.

If your initial guess doesn't correct the problem, add memory until you get it right. Later, when you're trying to squeeze more applications into memory, you may want to reduce it again. But never go below the suggested size, because that's the minimum for safe operation.

The dialog box you see when you go to the menu and choose the *About this Macintosh...* command (or the *About the Finder...* command in System 6) shows the memory allocated to the system software and to each program that's running, as well as how much of each partition is being used:



memory fragmentation *(CR)*

Note that the dialog box at the end of the previous entry reports not how much memory is available, but the *Largest Unused Block*. Even if we were to quit Word at this point, the largest unused block wouldn't be 1024K larger than it is now, because of *memory fragmentation*.

Each program claims a chunk of memory when it's launched, but when you quit a program, not all the RAM it used returns to the pool of available memory—some empty RAM is left between the program launched before it and the one launched after it. (This is perfectly analogous to

disk fragmentation, as described in the entry of that name in the hard disks section above.)

So as you open and close programs, your Mac's memory becomes fragmented, and you may eventually reach the point where you don't have a continuous block of RAM big enough to run a program. To minimize this problem, always begin by launching the program you use the most frequently, and are therefore least likely to quit. Then launch the program you use second most, and so on.

When you do run into *not enough memory* messages, you'll either have to quit some other programs to free up the RAM you need, or restart the Mac (wiping the RAM slate clean, as it were). If you have a continuing problem, try lowering the current memory size for one or more programs (see *setting an application's current memory* above) or buy more RAM.

RAM disks *(SA/CR/RS)*

A *RAM disk* is a portion of memory that's set aside to act as a temporary disk. You use a utility program to create the RAM disk, which then appears as an icon on your desktop. You can use a RAM disk as you would any other disk, but when you shut off your computer, everything in the RAM disk disappears.

So what good is it? Well, what's stored on a RAM disk can be retrieved a lot faster than what's stored on a disk. Put an application there and you'll notice that virtually all its operations speed up. Put your System and Finder there and all the things they do will speed up.

You can get RAM disk utilities from user groups, bulletin boards and commercial information services. Connectix's Virtual 3.0 (discussed below) includes a RAM disk utility and Apple offers one called ApplDisk specifically for System 7. An excellent shareware RAM disk utility that even includes crash recovery protection is RamDisk+ (it's

up to version 3.03 as of this writing); shareware guru Dave Mark says it's very well designed.

virtual memory *(SA/CR)*

Virtual memory is sort of the opposite of a RAM disk—it's a technique that lets the computer use part of the hard disk as if it were RAM. Portions of large files or programs get swapped from RAM to the virtual memory section of the disk and back again as needed. Virtual memory is useful for large graphics, long animations, complex sounds, lots of scanning and keeping a lot of files open at the same time.

Because virtual "memory" is actually on disk, it's a lot slower than real RAM. But it's also a lot cheaper. Even with RAM prices at an all-time low ($36/meg or so, as of this writing), storage space on a hard disk can cost as little as $3/meg, or even less (the bigger the drive, the cheaper it tends to be).

System 7 makes virtual memory available to any Mac that has a 68030 processor, to Mac IIs with a PMMU (paged memory management unit) chip added, and to Pluses and SE's with 68030 accelerator cards. And if you don't like the way virtual memory works in System 7, Connectix offers an alternative; see the entry on *Virtual 3.0* below.

using virtual memory *(CR)*

You turn on virtual memory in the Memory control panel (shown in the entry on the disk cache above). Choose the hard disk you want used for virtual memory from a pop-up menu, click the arrows in the *After Restart* window to set the amount of memory, close the control panel and restart your Mac.

You can only create as much virtual memory as there is contiguous free space on your hard disk (that's a single block of empty space, not the sum of separate blocks scattered all over the disk). And virtual memory will be limited by the amount of physical RAM you have. On my 5MB

machine, for example, the system only allows me 12MB of virtual memory, even though there are 32 megs of contiguous free space on my hard disk.

The best way to use virtual memory is sparingly. Accessing a file from a hard disk is much slower than getting it from RAM, so if you're working with a big file or program in virtual memory, everything will slow down. Virtual memory works best when you use it to run one program and one big file rather than a lot of smaller programs or files.

[In my experience, virtual memory slows things down considerably, particularly on faster Macs, and it makes a huge impact on the Plus, which has a slow SCSI port. Unless you're flat broke, buying more RAM is a better choice.—RS]

Virtual 3.0 *(Chris Allen/CR)*

If you're running System 6, you can still get virtual memory capabilities with a $200 program called Virtual 3.0 (for standard Mac 68030 systems and Mac IIs with a PMMU chip installed; if you have a Mac Plus, Classic or SE with a 68030 accelerator installed, you use a program called Compact Virtual).

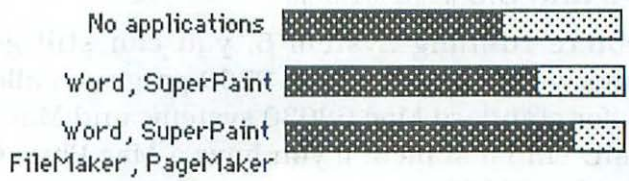
Virtual also allows Macs with 68030 accelerators to access up to 16 megs of physical RAM, and even lets you create a RAM disk from any real RAM installed on your Mac's motherboard. You might even want to consider this product if you're running System 7, since Virtual's memory management scheme is faster and uses less disk space than System 7's.

To run Virtual on a Mac II, you also need the PMMU chip. Connectix, Virtual's publisher, will sell you one for $180, rather than the $500 Apple charges.

the System heap *(SA/RS)*

Without getting too technical, the *heap* is a portion of memory set aside for a special purpose. There are the *System heap* and *application heaps*. You should never have to worry about application heaps, but you do need to pay attention to the System heap if you're running MultiFinder under System 6 with more than a few basic inits and/or applications (the *number* of applications is the problem, not the amount of memory you give each one).

When you choose *About the Finder...* from the menu on the System 6 desktop, you'll see a bar indicating how much memory is allocated to the System; the dark part shows how much of that allocation is in use. To provide enough breathing room for your System when several applications are open, about a third of the bar should be light when no programs are open.



The easiest way to adjust the System heap allocation is with a utility like CE Software's HeapFixer. It comes with most of CE's products, and is also available on bulletin boards and elsewhere. *[I don't recommend using HeapFixer unless you're really daring and have a problem that doesn't go away after you've ruled out everything else. If you do use it, make sure you have a complete backup of all your software, including your system.—RS]*

The System heap isn't supposed to be a problem under System 7, because it's supposed to adjust dynamically (automatically) to whatever's running. However, a few poorly written pieces of software don't dynamically adjust the System heap, so be especially careful of shareware and freeware when you're using System 7.

Chapter 4

Basic Mac software

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Tips for all applications

The tips in this section should work in virtually all Macintosh programs, from the Finder to obscure DA's. If they don't, don't blame us—blame the people who wrote the program, because they didn't follow the standard Mac interface.

basic terms *(AN)*

The entries in this chapter assume you understand the material in the *Guide for beginners* in Chapter 1. If you have trouble with any of the terms or concepts here, either look them up in the glossary or index, or read the *Guide for beginners* first.

escaping from hang-ups *(AN/ByB)*

In System 7, Option ⌘ Esc will usually free you from an application that's hung up, without your having to restart the computer. (This is almost reason enough all by itself to use System 7.)

Unfortunately this only works if you can still use the mouse. That's because it opens a dialog box that asks you if you want to quit and lose all unsaved work, and you can't choose the *Force Quit* button (which is what you're going to want to do if you're hung) from the keyboard. The *Force Quit button* should have a double line around it, so you can select it by simply hitting Return.

selecting multiple items *(Steve Michel/SA/AN)*

As mentioned in the *Guide for beginners* in Chapter 1, shift-clicking lets you select more than one object at a time. It acts as a toggle—not only do things that aren't selected get selected, but things that *are* selected get *de*selected when you shift-click on them.

You can also select multiple objects by dragging a selection rectangle around them (also described in the

Guide for beginners) and you can combine the two techniques. For example, if objects you *don't* want fall into the selection rectangle, just shift-click on them and they'll be deselected. Here's another way to combine them:

Let's say you have a single icon selected in a desktop window. If you hold down Shift while you drag a rectangle around four other icons, you'll have five icons selected when you're done. It also works the other way. If you have ten icons selected in a desktop window and then hold down Shift while you drag a rectangle around four of them, they'll deselect and you'll end up with six icons selected.

All these techniques work the same way in object-oriented graphics programs ("draw" programs) as they do on the desktop. (They don't work in paint programs because there are no objects to shift-click on.)

Shift-clicking can also be used to select portions of continuous material like text. Let's say you want to select three paragraphs of a word processing document. You'd click in front of the first character in the first paragraph, then place the I-beam pointer after the last character of the third paragraph, hold the Shift key down and click again. This causes everything between the two clicks—all three paragraphs, in this case—to be selected. (Some word processors have easier ways to select a lot of text, but this basic technique should work in all of them.)

Some of these techniques may be a little hard to visualize, but when you use them a bit, they'll quickly become obvious, and then automatic.

the double-click drag *(SA)*

mostly for beginners

To select text word-by-word, double-click on the first word and drag. The selection will be extended one word at a time.

cancelling fast *(AN/SA)*

In most places on the Mac, ⌘. will cancel what you're doing (printing, for example). It will also push the *Cancel* button in most dialog boxes. We've mentioned this shortcut elsewhere (because there are so many places where it works), but it's worth repeating (because there *are* so many places where it works). The Esc key also works, in most instances, as a substitute for ⌘..

deselecting with the arrow keys *(SA)*

In almost all applications, hitting ↑ or ← while text is selected places the insertion point at the beginning of the selection and deselects the text. Using ↓ or → does the same, but it puts the insertion point at the end of the selection. This can save you some time. Let's say you've selected some text and made it boldface. Instead of having to use your mouse so you can click at the end of the selection to begin typing again, you can just hit →. This will deselect the text and position the insertion point directly after it.

This works even in dialog boxes, where you often have some default text selected when the box opens. It's especially convenient in the Save As dialog box that usually comes up with the current title of a document already highlighted. If you want to name the new document something similar to the original (like changing *Title* to *Title 2)*, you don't have to retype the original name. Just hit →, then add what you want to the end of the document name.

stationery defaults *(Michael Bradley/DC/CR/JK)*

All applications have default settings for things like font and type size, ruler, print quality, spreadsheet size and data format. Sometimes you can change the defaults but often you can't. This means every new document will always start out formatted the standard way, whether you like it or not. If you don't like it, try using System 7's stationery feature to create templates of the formatting you want.

mostly for beginners

A *template* is a document with a special format that you use repeatedly—for example, one containing your letterhead, so you don't have to recreate the letterhead every time you want to write a letter. They're easy to make. All you have to do is open a new document and choose the formatting you want. When you're done, save the document with a name like *biz ltr*, *memo* or *standard Excel template*.

Then, on the desktop, select the document, hit ⌘I (for *Get Info)* and click the *Stationery pad* checkbox in the window that appears. The next time you need to create a document with that formatting, open the template. You'll immediately be asked to type in a new document name, and then the Mac will save the new file under that name, leaving the template untouched.

If you want to change the template, try opening it from within the application itself. If that doesn't work, select its icon in the Finder and uncheck the *Stationery pad* checkbox in its Get Info window. Then open the template and modify it the way you would any document. After you've finished modifying it, be sure to check the *Stationery pad* box again.

If you're using System 6, there's no stationery feature, but you can still make templates. Once you've made one, lock it with the *Locked* checkbox in the Get Info window, so you won't change it by mistake. When you open a template, use the *Save As...* command immediately, to create the new document. (Some applications also have an option for saving files as stationery inside the Save As dialog box.)

taking screen shots *(JK/AN)*

You can capture anything that appears on your Mac's screen at virtually any moment by pressing Shift⌘3. You'll hear a sound like a camera shutter clicking and a file called *Picture 1* will appear in your hard disk's window in the

Finder (if there's already a *Picture 1* file, it'll be called *Picture 2*, and so on). In System 6, there's no sound when you take the shot and the files are called *Screen 0, Screen 1*, etc.

Unfortunately, there's no easy way to take a snapshot of just one particular window, and no easy way to edit the entire screen shot if you only want to use part of it. You can edit System 7's screen shots in a limited way in TeachText (the Apple utility that opens when you double-click on a screen shot), but if you have a large screen, even a lot of memory won't stop you from getting a message that says *TeachText cannot copy from this document, the selection is too large* (which is annoying, and a run-on sentence to boot).

The System Folder

system software *(Clair Whitmer/JK)*

mostly for beginners

When you first buy a computer, it's the hardware that gets all the attention. But what really makes the Mac what it is—an easy-to-use and highly customizable personal computer—is the *system software.* Part of this basic software is written indelibly into your Mac's ROM; you never see it and can't modify it, short of buying a hardware upgrade.

The rest—the part you *can* control—is provided by the various programs that come with the Mac and are stored in the System Folder on the *startup disk* (the hard disk or floppy your Mac starts up from when you turn it on, and whose icon always appears in the upper right corner of the desktop). This chapter will show you how to use the system software to create an environment that best suits you.

System 7 and System 6 *(CR/Clair Whitmer/AN)*

System 7 is the latest version of the Mac system software. First released in May 1991, it comes with all new Macs, and is now more widely used than its predecessor, System 6.

System 7 and System 6 are major versions of the system software, each of which has gone through several minor versions that fixed bugs or added features (for example, System 6 went from 6.0 through 6.0.8). But since all the minor versions of System 6 are much more like each other than they are like System 7 (and vice versa), we usually refer simply to *System 6* and *System 7*, unless we're discussing some feature or problem that's in System 7.0 (say) but not in 7.0.1.

Except where noted, the information in this chapter refers to System 7 (although much of it applies to both versions). See the end of the chapter for tips that apply only to System 6. If you're trying to decide which version to use, see the section on *Choosing system software* below.

❦ System Folder basics *(SA/CR/JK/AN)*

mostly for beginners

It's easy to recognize the System Folder's icon, because it has a little picture of a Mac on it:

The two most important files in the System Folder are the *System* and the *Finder;* they're described in entries of their own below. What other files are in your System Folder depends on your personal preferences, and what these files are called depends on whether you're running System 6 or System 7, since each version of the system software gives them different names. In addition, System 7 organizes the various types of files into folders within the System Folder (System 6 doesn't). Here are some of the files that go in the System Folder:

- *drivers*—These programs allow the Mac to communicate with peripherals like printers; examples are the StyleWriter and LaserWriter files. System 7 puts drivers in the Extensions folder and lists them as *Chooser extensions* in the Kind column when you view

the Extensions folder's contents by name. In System 6, they're listed as *Chooser documents* or simply *documents.*

- *extensions* (called *inits* under System 6)—These programs run automatically when you start the Mac, and keep running invisibly in the background until you shut down. System 7 places them in a folder called *Extensions* and they're listed as *system extensions* when you view that folder by name. System 6 lists them as *Startup documents.*
- *control panels* (called *cdevs* under System 6)—These utility programs let you do things like set the volume level on the Mac's speaker, create a new desktop pattern or establish file sharing with other networked Macs. System 7 stores control panels in the Control Panels folder, and lists them as *control panels* in the Kind column. System 6 calls them *Control Panel documents* or simply *documents.*
- *printer font files*—These are the outline fonts that get downloaded to printers (typically PostScript printers; see Chapter 6 for more about them). They're stored in the Extensions folder and show up as *system extensions* under System 7, *documents* under System 6.
- *preferences* (or *prefs) files*—Applications use these to keep track of the default settings you prefer—for example, whether you want Short or Full menus in Word or how many keystrokes you want to save after in Nisus. Prefs files typically contain the name of the application that created them—*Word Settings,* say—and are listed as *Word documents* (or whatever the application is) in the Kind column. They're stored in the Preferences folder.
- *application support files*—These include help files and spelling dictionaries for specific programs. Sometimes you can put these files elsewhere—usually in the same folder as the application itself—but lots of applications need for them to be in the System Folder. Like prefs files, support files are listed as documents of the application they work with.

- *temp files*—Applications create these files for temporary storage while you're working. If you crash, you can sometimes use a temp file to help you recover your data (for more on this, see the section on recovering data in Chapter 8). Temp files are identified as documents of the application that uses them.
- *desk accessory information*—Most DA's store their information (like the pictures you put in the Scrapbook) in the System Folder. Most of these files are listed as *file* or *document* but some are identified as documents of the DA that created them.

Besides the Control Panels, Extensions and Preferences folders mentioned above, the System Folder contains three other folders:

- The *Apple Menu Items* folder stores the items that appear on the menu. You can put any DA, document, application or folder you want on the Apple menu by dragging it into this folder. The ones that come with the system software are described in the section about the menu below.
- The *PrintMonitor Documents* folder stores the temp files that are created when you print a document using *background printing* (described in Chapter 5). PrintMonitor puts files that are to be printed into this folder, and they're automatically fed from there to your printer.
- If you want a program or document opened automatically when your Mac starts up (as long as there's enough memory), just put it in the Startup Items folder.

(Starting with System 7.1, there's also a Fonts folder.)

installing system files *(CR)*

When you drag a DA, driver, extension or control panel onto the System Folder's icon, it automatically gets put into the proper folder. If you want to put a file in the System Folder but don't want it placed in any of the folders within the System Folder, drag the file into the System Folder's open window instead of onto its icon.

System 6 doesn't organize system files into folders, but you install drivers, extensions, control panels and printer files the same way—by dragging them to the System Folder. To install desk accessories in System 6, you add them to the System file with Font/DA Mover (or the equivalent; for details, see *System 6 tips* below).

System vs. system *(SA/JK)*

mostly for beginners

There's an important distinction between *system* and *System*. Capitalized, *System* always refers to the System file itself or a particular version of the system software (e.g. *System 7* or *System 7.0.1*).

Lowercase, *system* can refer to any of three things: a system *set*—the collection of system software files you're using; the customized environment you've created by adding fonts, sounds, printer drivers, etc. to—or subtracting them from—the System Folder; or the hardware setup you use—say, a Mac IIsi with a particular hard disk drive and a particular printer. A *system file* (without caps) is any file in the System Folder that helps run your computer—control panels, printer drivers and the like, including *the* System file and the Finder.

the System file *(SA/Clair Whitmer)*

mostly for beginners

The System file is the heart of the Mac's *operating system* (the software that controls a computer's basic operation); you can't run a Mac without it. Most of the information in the System file consists of programming instructions that work hand-in-hand with the instructions in the Mac's ROM, and you can't change these. In System versions through 7.0.1, however, you can change some of the things stored in the System file—fonts and sounds (and DA's, if you're using System 6). The next entry tells you how.

The size of the System file varies depending on what version it is, what machine you're running it on and how many fonts and sounds are stored in it. When you turn on

your Mac, the System file gets loaded into RAM (along with the Finder, extensions and some control panels). The larger it is, the more memory it requires, which leaves that much less memory free to run applications and work on files.

✎ *managing fonts and sounds* (CR/JK)

When you double-click on the System file icon, a window opens that shows all the fonts and sounds it contains (starting with System 7.1, you'll only see sounds; fonts will be kept in a Fonts folder). To view a font or hear a sound, just double-click on it. To install a new one, close all open applications and drag the font or sound onto the System Folder's icon).

Be careful when installing sounds from sound suitcase files, though: if you drag a sound suitcase onto the System Folder icon, it may be deleted, along with the sounds it contained. Instead, double-click the suitcase icon to open its window and drag the sounds you want from inside it out onto the System Folder icon.

Since fonts and sounds use up memory, you may want to use a utility like Suitcase or MasterJuggler (see Chapter 7 for more about them). These programs don't decrease the amount of memory fonts and sounds consume, but they do let you control which ones are loaded into the system, so you can easily turn them off when your Mac needs memory for something else.

In System 6, you need a special utility to install fonts and sounds. You can use Font/DA Mover (which comes with the system software) for fonts, but only third-party programs like the ones mentioned above handle sounds as well.

✎ *freeing up memory* (Clair Whitmer/JK)

When you're using files or programs that require a lot of memory, you can free some memory up by moving control panels and extensions you don't need out of your System Folder and then restarting. You can also shrink the amount

of memory consumed by your System file itself by removing fonts and sounds from it (see the previous entry).

the Finder *(SA/JK/AN)*

mostly for beginners

The *Finder* is the program that creates the desktop and its menus (, File, Edit, etc.). It can actually be replaced with another program, but since the desktop is usually the first and last thing you see when you work on a Mac, it's hard to think of a Mac running without it. (The term *Finder* is often used instead of *desktop*, as in *Quit the application and return to the Finder.* It doesn't usually work the other way, though: *Rearrange the icons on your Finder.)*

In System 7, you can run as many applications simultaneously as your Mac's memory permits, and you can see the desktop in the background while you work. To use more than one application under System 6, you need to run MultiFinder (described in the *System 6 tips* section below). Otherwise, you can only run one application at a time, and the desktop disappears while you're working in it (which saves memory).

paring down your System Folder *(SA/CR)*

If you have plenty of room on your hard disk, you may not care if unused files are taking up space in your System Folder. But if you're running out of disk space, you'll want to get rid of them. For example, if you don't have a laser printer, you don't need the LaserWriter drivers. You can also toss special-purpose utilities or DA's like the Puzzle, Map, CloseView, or Easy Access if you won't be using them.

invisible files in the System Folder *(LA)*

important warning

Utilities like ResEdit and DiskTop let you see invisible files in your System Folder. Some such files may be viruses or their hell-spawned get *[Don't you love these literary touches?—AN]* but the system software and some applications also create invisible files that are essential to

their operations, so don't delete any invisible files unless you know what you're doing.

✎ *trashing temp files* (SA/AN)

Well-mannered applications erase their temp files when you quit, but if you crash (or accidentally turn off the machine without quitting the application), the temp file will remain in the System Folder. (That's what it's supposed to do, so you can recover your file.)

Word is notorious for leaving its temp files around; they're named *Word temp 1*, *Word temp 2*, etc. PageMaker creates files called *PM001* and so on; FileMaker creates a *FileMaker temp* folder and puts its stuff in there. Check your System Folder occasionally for errant temp files and throw them away—but don't do it when the application that created them is running.

✎ *the startup scan* (SA/AN)

Usually it's obvious which disk is the startup disk, but what if you have two or more hard disks connected or two floppies inserted? Here's where the Mac looks for a startup disk first, then second, etc.

1. the internal floppy drive
2. the second internal floppy drive (if there is one)
3. the external floppy drive (if there is one)
4. the disk specified with the Startup Disk control panel (called *Startup Device* in System 6)
5. the external *serial* (non-SCSI) hard disk
6. the internal hard disk (or any other device with a SCSI ID number of 0)
7. other SCSI devices (starting with ID number 6 and working its way down to 1)
8. after a 15-second wait, back to the internal floppy drive

The first disk that the Mac finds that has a System Folder on it becomes the startup disk.

avoid multiple systems (SA/CR/JK)

In general, it's best not to keep more than one System Folder (or System file) on any hard disk or floppy. Multiple systems can make the Mac schizophrenic and cause it to crash a lot.

Most people don't purposely put more than one system on a disk, of course. This usually happens because you've inserted a floppy that contains a program you want to install and then dragged *all* the files on the floppy, including its System Folder, over to your hard disk.

Periodically, and especially whenever you're experiencing more system crashes than usual, use the *Find* command or Find File DA to search your hard disk for the word *System*, and remove any extra System files or System Folders.

an emergency startup floppy (CR)

If your Mac won't start up from its regular startup disk, you can start it up from the System 7 Disk Tools floppy (or, depending on which Mac you have, a System 6 System Tools or System Startup disk). Your Mac won't have a lot of its normal fonts, DA's and printing capabilities, but you'll usually be able to access what's on your hard drive.

setting startup applications or documents (CR)

You can set your Mac to start with specific applications, folders, documents or other items open. In System 7, you just drag the items (or their aliases) into the Startup Items folder inside the System Folder. When you restart, the Mac will open as many of them as it has room for in memory. To keep an item from opening at startup, just drag it back out of the Startup Items folder.

In System 6, you use the *Set Startup* command in the desktop's Special menu (which also lets you set the Mac to start in the Finder or in MultiFinder). Here's how to use it:

- To start up in an application, select its icon on the desktop and then choose *Set Startup*. The dialog box that appears should indicate that that application is set to automatically open on startup. If you also choose to start up with MultiFinder, you can set documents or multiple applications to open in this way.
- To start up with a DA open, select it from the menu, choose *Set Startup* and then click the *Opened Applications and DAs* button (but be aware that in doing so, you're also telling the Mac to automatically open whatever applications you're currently running).

The menu

adding items to the menu *(CR/JK)*

mostly for beginners

The menu gives you quick access to anything you need to have handy, whether it's a folder, a program, a document or even a shared file on someone else's Mac. You can have as many items on the menu as you like.

To put an item on the menu, just copy it into the Apple Menu Items folder; to remove it, just drag it back out. (If it's a shared item, you'll need to use an *alias*, not the item itself—see *aliases* under *Tips on icons, files and folders* below).

Since DA's are designed to go on the menu, System 7 automatically puts them in the Apple Menu Items folder when you drag them onto the System Folder icon. In System 6, *only* desk accessories can go on the menu, and you have to install them with Font/DA Mover or a third-party DA manager program (see *System 6 tips* below).

Macs come with several items already installed on the menu—they're described in the next several entries, in alphabetical order. For more sophisticated third-party alternatives to some of them, see Chapter 7.

Alarm Clock *(Nicholas Lavroff/JK/AN)*

mostly for beginners

The Alarm Clock desk accessory functions like a real alarm clock (albeit a feeble one). You can also use it to reset your Mac's internal clock and calendar, or just leave it open anywhere on the desktop to keep track of the time. When you click the little flag to the right of the time, the clock opens down (as shown below) to let you adjust its settings.

Click on the bottom left square to set your Mac's clock, the bottom center to set the date, and the bottom right to set the alarm. The middle panel is where you actually adjust the settings—just click on the number you want to change.

To turn the alarm on, click the weird little icon at the left end of the middle panel, and the alarm clock icon will look like it's going off. When it actually does go off, your Mac will beep once and an alarm clock icon will alternate with the at the top of the menu (until you turn it off). It won't rouse the dead, but it's adequate once you get used to looking for it.

Calculator *(Nicholas Lavroff/SA/JK)*

You can use the Calculator DA (shown on the next page) either by clicking its keys with the mouse or by typing in numbers from the keyboard. (Using the numeric keypad makes it feel like a desktop adding machine, except that it doesn't print a tape.) You can also copy the number the calculator is displaying and paste it into the document you're working on. And you can paste things *into* the calculator—not just simple numbers, but also chains of calculations, like 15+17*92/3.

It's not the most feature-laden calculator around, but it's simple to use, and it can display large numbers by using exponents. *[I know it's uncool, but I find it simpler just to use a calculator on my desk.—AN]*

Control Panels *(JK)*

These important programs get a section of their own. It's immediately after this one.

the Chooser *(SA/JK)*

The Chooser is most often used to choose a printer (how to do this is described in Chapter 5). But when you're working on a network, it also lets you select *zones*, *shared files* and *file server volumes* (all that's covered in Chapter 17).

Each time you open the Chooser, it scans the System Folder for drivers (the kind of programs it recognizes). So you can add printer and network drivers at any time—you don't have to restart your system the way you do with extensions and control panels.

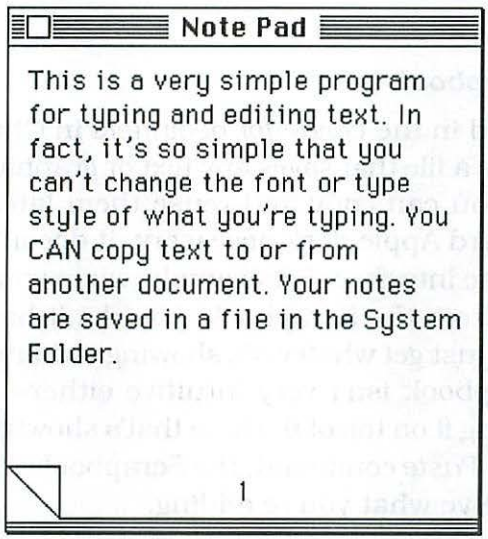
Key Caps *(JK)*

This utility displays a keyboard on the screen that shows you what character—or symbol—you get in a given font for each key (or key combination). You select the font you want to view from the Key Caps menu. (See Chapter 6 for more on Key Caps.)

Note Pad *(Nicholas Lavroff)*

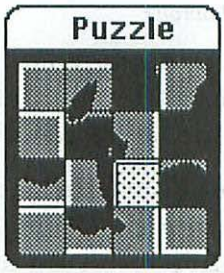
As its name suggests, the Note Pad DA is a place where you can jot down short notes. They're automatically saved in the Note Pad File in the System Folder.

The Note Pad doesn't have the capacity for epic poems or historical novels, though—it only allows 257 characters on each of its eight pages. And unlike the Scrapbook, the Note Pad can't handle graphics. But you *can* cut and paste text to or from another document. To get from one page to the next, click on the dog ear at the bottom left corner of the pad.



Puzzle *(Nicholas Lavroff)*

The Puzzle DA (shown at the top of the next page) is just a distraction, designed to frustrate you so that you go back to work *[unless you're a master of space-time who can crush its puny challenge like a little bug!! Ha!!—AN]*. The object is to rearrange fifteen tiles to reveal a familiar image (no prizes for guessing what it is).



You move tiles by clicking them when they're next to the vacant spot. Clicking the tile slides it into the vacant spot. It's not an easy puzzle to solve; I haven't managed it yet. *[Neither have I. Gee, I wish I were a master of space-time.—AN]*

the Scrapbook *(SA)*

As discussed in the *Guide for beginners* in Chapter 1, the Scrapbook is a file that saves any text or graphics you paste into it, so you can copy and reuse them later. Although it's a standard Apple desk accessory, it doesn't follow the standard Mac interface. For example, when you cut or copy something from the Scrapbook, you don't have to select it first—you just get whatever's showing. Adding something to the Scrapbook isn't very intuitive either—it *feels* like you're pasting it on top of the item that's showing, but when you give the *Paste* command, the Scrapbook creates a new page to receive what you're adding.

The Scrapbook window isn't resizable, but even though you can see only part of a large graphic you've pasted in it, the entire graphic *is* stored. The things you store in the Scrapbook are kept in a file named *Scrapbook file* in the System Folder. If you change the name of that file or move it out of the System Folder, the Scrapbook will be empty the next time you open it.

Since the Scrapbook contents are in that file, you can transfer them from one disk to another. You can even have several Scrapbook files (with various names) on the same

disk—just rename whichever one you want to use at the moment *Scrapbook file.*

Apple's Scrapbook DA was an elegant concept back in 1984, when it was introduced, but as far as features are concerned, it's been surpassed by the commercial utilities described in Chapter 7.

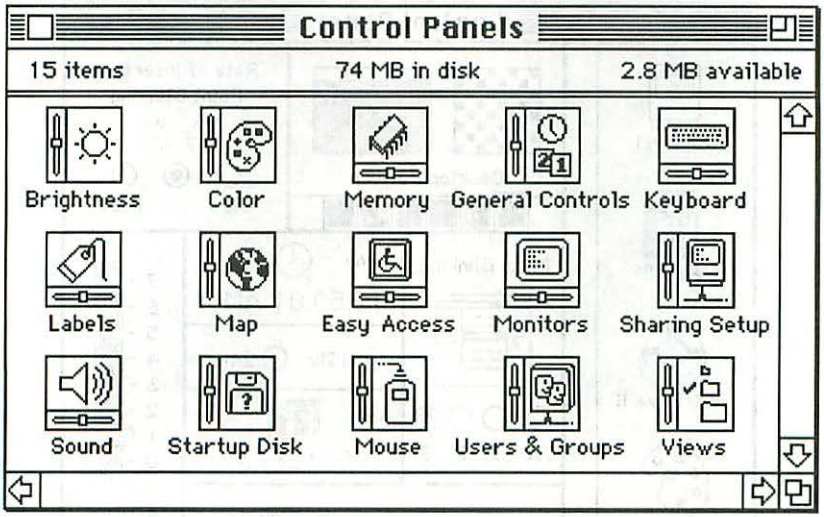
very hot tip

The control panels

using control panels *(AN/SA/Nicholas Lavroff)*

Choosing *Control Panels* from the menu opens a window like the one shown below. It contains a variety of utilities that give you control over various aspects of the Mac. (In System 6, choosing *Control Panels* from the menu opens a dialog box of sorts. See the next entry for details.)

mostly for beginners

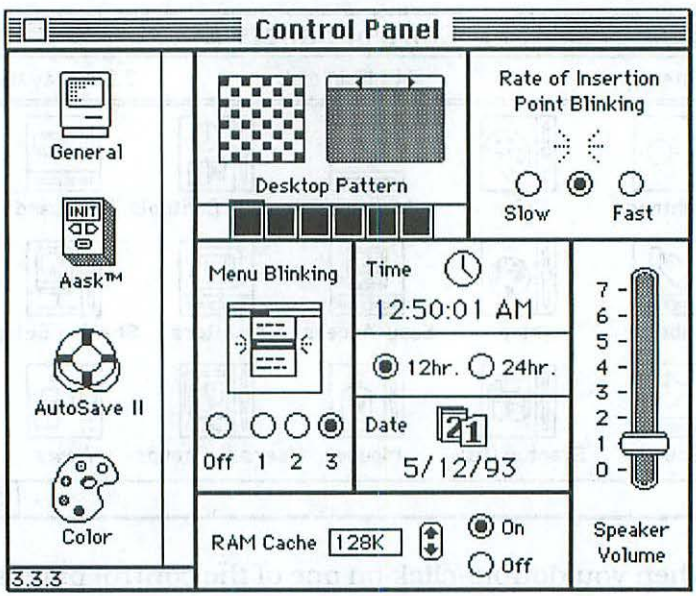


When you double-click on one of the control panels, its window opens so you can adjust its controls. This section describes the control panels that come with the Mac's system software, but there are a lot of third-party control panels too. Some of these are discussed in Chapter 7.

The basic Apple control panels are *General Controls, Keyboard, Mouse, Sound, Color, Map, Easy Access, Views, Labels, Startup Disk* and *Monitors.* In the entries below, we describe what they do and give you our recommended settings for them. The *Memory* control panel is discussed in Chapter 3; likewise, *Sharing Setup, Users & Groups* and *File Sharing Monitor,* which have to do with sharing files on a network, are discussed in Chapter 17.

System 6's Control Panel *(Nicholas Lavroff/JK)*

In System 6, control panels are called *cdevs* (for control panel *devices)* and *Control Panel* is the name of the DA that lets you access them. When you select *Control Panel* from the menu, you get a window like the one below with a scrolling list of icons displayed on the left side. When you click an icon on this list, its controls appear in the area to the right.



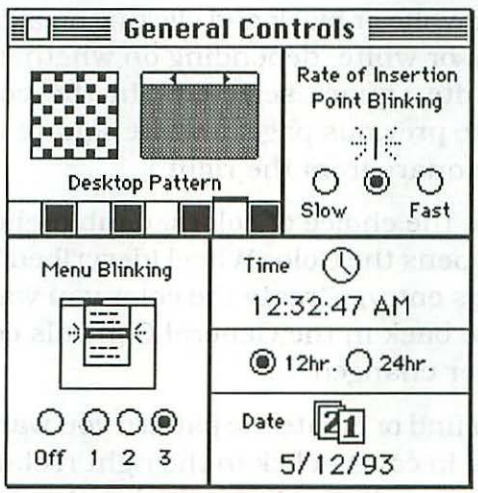
Because System 6 has fewer features than System 7, it has fewer control panels. System 6 includes the speaker

volume and RAM cache controls in its General cdev, whereas System 7 handles them in its Sound and Memory control panels. Apart from these minor differences, though, cdevs/control panels work the same whether you're running System 6 or System 7.

❦ *recommended General Controls settings* (AN/SA/JK)

All of the settings in this control panel are kept in a portion of memory called *parameter RAM* (or *PRAM*)—except for the desktop pattern, which is stored on disk.

Because parameter RAM is powered by the Mac's battery, these General settings aren't lost when you turn the Mac off. And because these settings are held in memory, not on disk, they stay the same (until you change them), regardless of what startup disk you're running from.



The first setting (in the upper left corner of the illustration above) controls the pattern on your desktop. On a black-and-white system, you should probably stick with the default pattern, a medium gray, because it's quite pleasant for daily use. But if you want to change it, here's how:

In the square on the left is an enlarged view of the pattern; in the rectangle on the right is what the pattern looks like at actual size. As you can see, the default pattern is composed of alternate black and white dots.

You can make your own pattern by clicking in the left square to turn the squares on and off until you like the pattern you see in the right rectangle. There's also a whole slew of built-in choices; to cycle through them, click on the little arrows above the right rectangle.

If you're working in color, you'll see a strip of eight colored squares beneath the desktop patterns. Click on a color and then on a dot in the left square above it; the dot will change to the color you've chosen. (Clicking on the dot again returns it to the previous color.)

On a monochrome monitor, each of the eight squares will be either white or black and clicking on a dot will either turn it black or white, depending on whether you have a black or white square selected. (In the control panel shown on the previous page, a white square is selected—the second square from the right.)

To change the choice of colors, double-click on any of them; that opens the Color Wheel (described below in the *Color settings* entry). Create the color you want, click *OK* and you'll be back in the General Controls control panel with the color changed.

When you find or create the pattern you want—in black-and-white or in color—click in the right rectangle and the pattern will immediately be applied to the desktop.

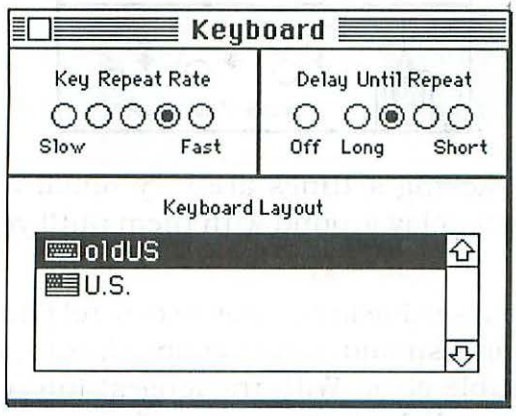
Not surprisingly, Rate of Insertion Point Blinking controls how fast the insertion point blinks. This is a totally subjective matter, so set it wherever you like—but do try *Slow* some time and see if you don't find it less distracting. Some people prefer *Fast*, because that makes the insertion point easier to locate. It comes set on the middle setting.

Menu Blinking controls how many times a command on a menu blinks after you choose it. If you don't think subtle feedback is important, try setting Menu Blinking to *Off*, but most people find it disconcerting to select a command and not have it acknowledged. Still, three times is overkill. If you have a nervous system, once should be plenty.

As for the Time and Date settings, let reality be your guide. But here's an interesting sidelight. One of Sharon's students handed in an assignment late, but said he had actually finished it the week before and had just forgotten to give it to her. As Sharon expected, the Date Created and Date Modified on his disk file showed that he had done it earlier that same morning. If he'd been smart enough to *reset* the date on his Mac before doing the assignment....(Notice: *The Macintosh Bible* does not condone cheating. The information we provide is to be used for good, not evil.)

Keyboard settings *(AN/Nicholas Lavroff)*

In the Keyboard control panel, Delay Until Repeat controls how long it takes before a key you're holding down begins to automatically repeat, and Key Repeat Rate controls how rapidly the key repeats after it begins repeating. Key Repeat Rate works best at either of the two fastest speeds and Delay Until Repeat at either of the two middle choices.

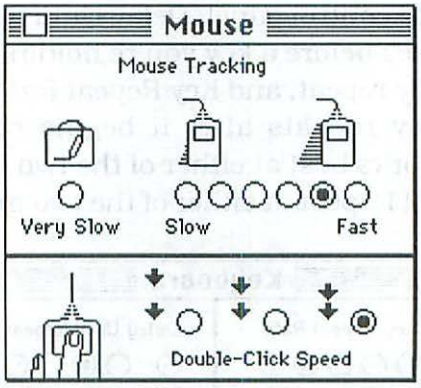


Keyboard Layout lets you choose a layout other than the standard US qwerty (boy, was that easy to type!) arrangement, if you've got the right keyboard and software installed. Apple makes keyboards for more than twenty languages.

Mouse settings *(AN)*

The top setting in the Mouse control panel is for Mouse Tracking. At the faster settings (on the right), a mere flick of the wrist moves the pointer a long distance (so it feels more like badminton than tennis). These faster settings are useful for large screens, when you really want to cover distance fast.

The slower settings (on the left) make moving the pointer feel more like bowling than tennis. They're useful if you have a small screen, or if you always find yourself overshooting the mark when you move the pointer.



Mouse Tracking settings are very much a matter of personal taste. Play around with them until you find one you like.

The bottom setting in the Mouse control panel tells the Mac how long it should wait after one click to see if you're going to double-click. With the longest interval set, the Mac will treat clicks that are fairly far apart as double-

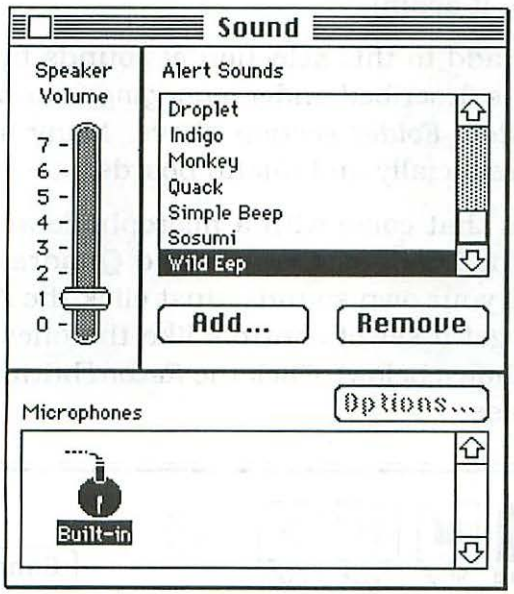
clicks; with the shortest interval set, you'll have to double-click pretty fast or the Mac will think you're giving two separate clicks rather than double-clicking.

I recommend either the short interval (on the right) or the medium one (in the middle); if you use the long interval (on the left), you'll always be accidentally double-clicking on things and opening them when you only wanted to select them. But if you have some impairment of your fine motor skills, from age or illness, the long interval can be useful.

very hot tip

Sound settings *(Nicholas Lavroff/JK/SA/AN)*

The Sound control panel lets you control how loud the Mac's alerts—and any other sounds it makes—will be. There are eight settings, from 0 to 7 (the loudest). When you slide the control to change the volume, the Mac gives you a demo of the new volume.



If you don't want to hear any beeps at all, slide the control to 0; instead of making sounds, the Mac will flash

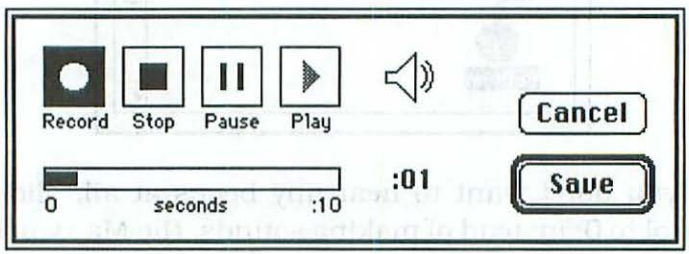
the menu bar when it wants your attention (except when starting or restarting—the Mac always makes noise then).

You can also choose which of several sounds the Mac will use to get your attention. System 7.0.1 gives you a choice of the normal (simple) *beep*, *indigo* (as in *Mood Indigo*—a sound reminiscent of the big band era), *sosumi* (which sounds like a toy train whistle, except more percussive; the name is obviously a pun—*so, sue me*—but we're not sure what the connection is between the pun and the sound), *droplet*, *quack* and *wild eep* (you can probably imagine these last three better than we could describe them—except that the quack sounds like a person imitating a duck more than it sounds like a duck itself).

When you click on a new sound in the list, the Mac demos it for you (at whatever volume you've selected). Whichever sound is highlighted when you close the window is the one that the Mac will use as its alert sound (until you change it again).

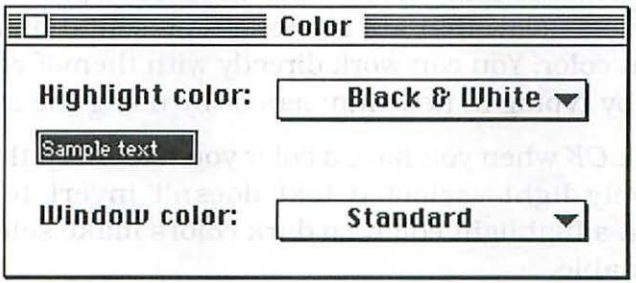
You can add to this selection of sounds by installing new ones, as described under *managing fonts and sounds* in the *System Folder* section above. Many sounds are available, especially on bulletin boards.

On Macs that come with a microphone and a sound port (like the LC II, si, Classics and Quadras), you can also record your own sounds. Just click the *Add* button and you'll get a set of controls like the ones on a tape recorder (shown below). Click the *Record* button and start making noise.

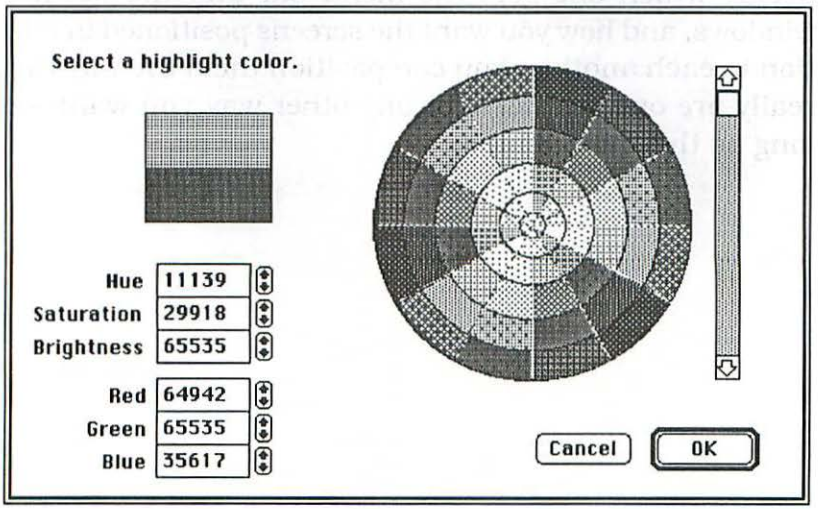


Color settings *(SA/Nicholas Lavroff/AN/JK)*

On color Macs, the Color control panel lets you change the color of window borders and the color of the background that surrounds highlighted text. (You change the color of the desktop itself in the General Controls control panel.) A list of colors appear on pop-up menus, and you can mix your own highlight color.



To do that, select *Other...* from the *Highlight color* pop-up menu. That opens the Color Wheel dialog box (shown below). The wheel has a dot in it that shows the currently selected color. You can click anywhere in the wheel to move the dot, or you can drag it around.



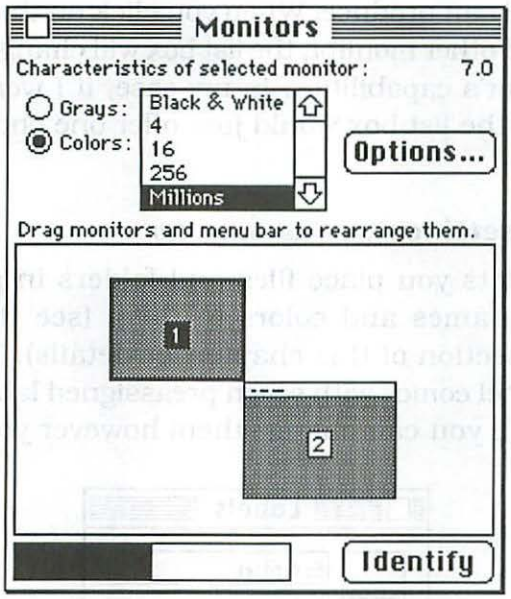
To change the *hue* (the actual color), move around the circle. To decrease the *saturation* (the intensity of the color), move in towards the center of the circle. To change the *brightness*, use the scroll bar to the right of the wheel. (When you move the scroll box all the way to the bottom, you get black no matter what the hue or saturation is.)

There's a two-toned square of color in the upper left; the lower half shows the current color and the upper half the new color. Below that are numeric representations of the current color. You can work directly with them if you like, either by typing in new numbers or by using the arrows.

Click *OK* when you have a color you like. Keep the color relatively light—selected text doesn't invert to white against a highlight color, so dark colors make selections unreadable.

Monitors settings *(AN)*

The Monitors control panel (shown at the top of the next page) lets you specify how many colors or shades of gray appear on your monitor. If you have more than one monitor connected to a Mac, this control panel also lets you decide which one gets the menu bar and the desktop windows, and how you want the screens positioned in relation to each another. You can position them the way they really are on your desk, or any other way you want—as long as they're touching.



I only use monitor 1 for color programs, and usually leave it turned off. But the pointer still travels into the part of the desktop set aside for monitor 1 (to get it not to do that, I'd have to actually remove monitor 1's video card from my Mac). It's quite annoying to have the pointer keep disappearing into a black screen, so I position monitor 1 so that it's just touching the least-used corner of monitor 2 (away from both scroll bars), as shown above. Amazingly, I still lose the pointer a fair amount, but less often than if I positioned monitor 1's desktop anywhere else.

To change which monitor the menu bar shows up in, you just drag the miniature menu bar (shown above at the top of monitor 2) to the other monitor's icon. The Mac assigns a number to each monitor, depending on which slot its card is in; if you're not sure which screen is which, click the *Identify* button and the numbers will flash on the screens themselves.

The list box at the top of the control panel shows the number of colors or shades of gray that the selected monitor's

video board can produce. When you click on the other icon to select the other monitor, the list box will change to display that monitor's capabilities. In my case, if I were to select monitor 2, the list box would just offer one choice—*Black & White.*

Labels settings *(Nicholas Lavroff/CR)*

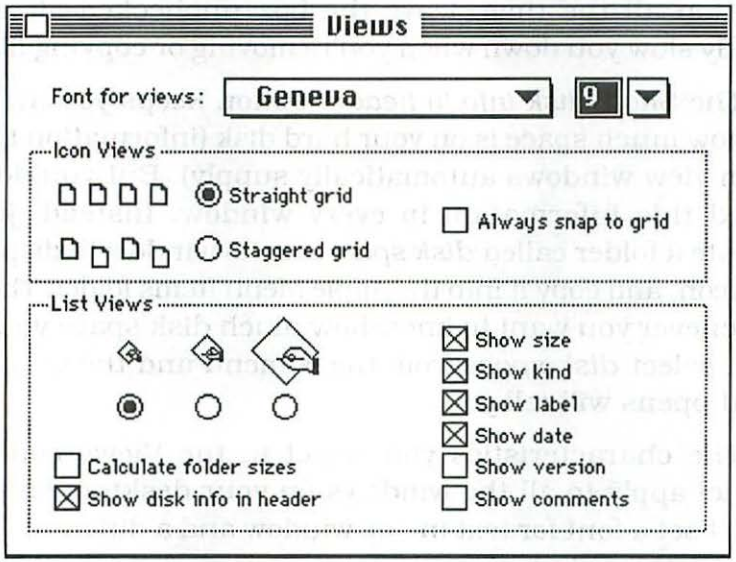
System 7 lets you place files and folders in groups, by assigning names and colors to them (see the *Tips on windows* section of this chapter for details). The Labels control panel comes with seven preassigned labels (names and colors); you can change them however you want.

Just select any name and type a new one, or click on any color and select a new one from the Color Wheel that appears. When you close the control panel, the new names and colors will show up in the Labels menu in the Finder.

Views settings *(Nicholas Lavroff/CR/JK)*

The Views control panel (shown on the next page) was also introduced in System 7; it lets you customize the appearance of Finder windows to some extent. You can change the font and size of the text in windows and icon names (although menus and window titles stay in the Chicago font).

If you view windows by Icon or by Small Icon, you can keep your icons neatly arranged by having them snap to a grid that is either straight or staggered. (To tidy up windows that already contain files, you have to open them and choose *Clean Up Window* from the Special Menu.)



You can tell the Finder what types of information to display in windows that are viewed as lists. The only category you can't eliminate is an item's name.

The categories you leave checked are also the ones that will show up as choices on the View menu. (Three categories are permanent and always show up there—*by Icon, by Small Icon* and *by Name.)*

The version and comments boxes come unchecked, and you should leave them that way. Most people rarely need this information, and if you do need it for a particular file, you can get it by selecting *Get Info* from the File menu.

[Consider eliminating label *and* kind *as well; you'll be able to get a lot more information on your screen. There are*

much better ways to organize files than by labels, and you can get the kind information (what program created the document) with Get Info.*—AN]*

You're also given the choice of having the Finder calculate and display folder sizes, but unless you need this information all the time, leave the box unchecked—it can really slow you down when you're moving or copying files.

The *Show disk info in header* option keeps you aware of how much space is on your hard disk (information that icon view windows automatically supply). But you don't need this information in every window. Instead, just create a folder called *disk space*, set its window to display by Icon, and copy it into the Apple Menu Items folder. Then, whenever you want to know how much disk space you've got, select *disk space* from the menu and the window that opens will tell you.

The characteristics you select in the Views control panel apply to all the windows on your desktop, so you can't set a font for text in one window and a different font for another window.

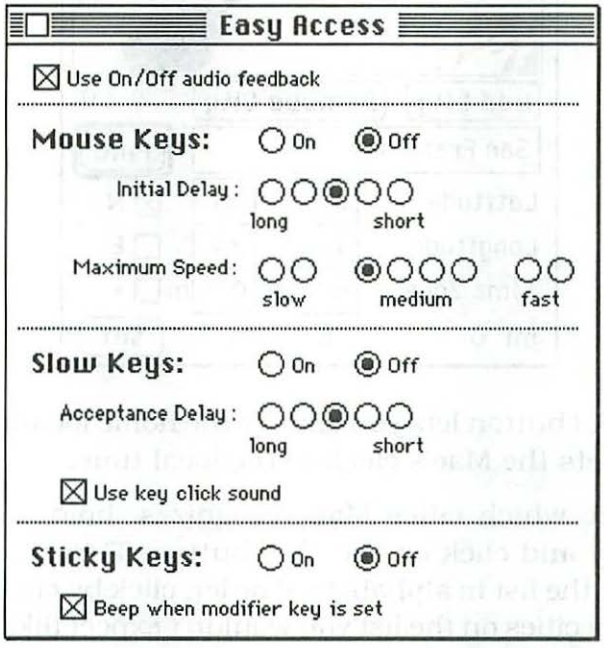
Startup Disk settings *(Nicholas Lavroff)*

This control panel is so simple, it doesn't require an illustration here. If your Mac uses two or more hard drives with System Folders on them, you can choose which one it will start up from in this control panel. Once chosen, that drive will remain the startup drive until you choose a different one.

Easy Access *(Nicholas Lavroff/DC)*

Easy Access is designed for people with disabilities who have difficulty using the mouse or issuing multiple key commands. The top item on its control panel (shown on the next page) is Mouse Keys, which lets you use the numeric keypad as a mouse. Slow Keys makes the Mac wait until you've held a key down for a bit before it gets

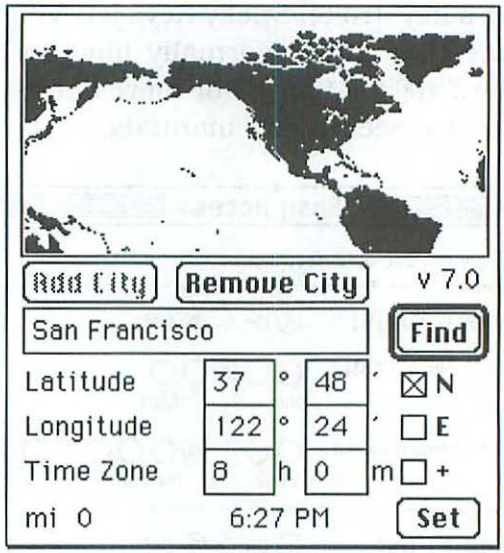
registered as a keystroke; Sticky Keys lets you press keys one at a time that would normally have to be pressed together (like ⌘S for *Save*). For more details on how to use Easy Access, see Apple's manuals.



Map *(Nicholas Lavroff)*

If you travel with a PowerBook or other Mac portable, you may have a use for the Map control panel (shown at the top of the next page). Enter the name of a city and click *Find*, and Map will display its latitude and longitude, the local time there and how far it is from your home location.

You can also type in the latitude and longitude instead of the name. *[Isn't that useful! So often I know the exact longitude and latitutude of the city I'm in, but haven't got a clue to its name.—AN]* You can even pick a location by clicking on its approximate position on the map. *[In fact, it's almost impossible to get close enough to do this. The map is just too small.—AN]*



The *Set* button lets you change the home location. This also resets the Mac's clock to the local time.

To see which cities Map recognizes, hold down the Option key and click on the *Find* button. This scrolls you through the list in alphabetical order, click by click. There are some cities on the list you wouldn't expect (like Cupertino) and some I'd never heard of (like Bamako and Bangui). *[But not, say, Phoenix or Tucson.*

As a map-lover, the shoddy execution of this utility really annoys me. It could be quite useful, if the people who put it together cared about that, instead of treating it as some sort of gimmick.

It needs many more US cities—not just the home towns of everyone who worked on it, where they all live now and a few megalopolises. It needs a way to show (and print out) the whole list of cities the program knows about, and a way to expand the map to fill the screen, so you can see some detail on it. And it should tell you what state and/or country a city is in (where the hell is Bamako or Bangui—or, for that matter, Springville, a US "city" that Map lists?).

In its present state, Map is the kind of thing you'd expect to find as a free public-domain trifle on a bulletin board somewhere, not distributed by Apple with every computer it sells.—AN]

Choosing system software

avoid first releases of system software *(AN/JK)*

The first releases of Mac system software (or any software) are often pretty buggy. Unless you enjoy being a pioneer (and the arrows through the hat that go with it), you should generally avoid versions of the System and Finder that end in 0. Wait for version .0.1 or .0.2 before switching, or at least until the .0 version has been out for several months and seems to be problem-free.

For example, System 7.0 and 7.0.1 have a problem that can cause files and folders to disappear off your hard disk. (To fix that problem, you need Tune-Up 1.1.1, an Apple program you can get free from dealers.)

which system for which Mac *(SA/JK/CR)*

If you buy a new Mac, it'll come with the latest version of System 7. But many Macs can use earlier versions too. Here's a chart of which versions work with which Macs:

Mac	System	Finder
128K	2.0	4.1
512K, 512Ke	3.2	5.3
Plus, SE, II	6.0.2 or later	6.1 or later
SE/30, IIx, IIcx	6.0.3 or later	6.1 or later
Portable	6.0.4 or later	6.1 or later
IIci, IIfx	6.0.5 or later	6.1 or later
IIsi, LC, Classic	6.0.7 or later	6.1.7, 6.1.8, etc.
Classic II, LC II	7.0.1 or later	7.0.1 or later

PowerBooks	7.0.1 or later	7.0.1 or later
Quadras	7.0.1 or later	7.0.1 or later

Apple recommends version 6.0.5 and up if you've got a Plus or better. Older versions use up less memory, but memory upgrades have become so affordable, that's not a sensible reason to use really old system versions (6.0.3 or earlier).

Notice that not all Macs allow you the choice between System 6 and System 7: the Quadras and the Classic II *require* System 7.0.1, as do the PowerBooks 140 and 170. The PowerBook 100 and LC II can actually use System 6.0.8, although Apple recommends against it.

All the Macs that can run System 6 can run System 7 too, although you may need to buy additional hardware (see the next entry). You shouldn't try using System 6 *or* 7 on the early Macs (128K, 512K and 512Ke).

System 7 hardware requirements *(JK/SM/CR)*

Officially, System 7 only requires a SCSI hard disk and two megs of RAM, but that's just to run the system and a bit of additional software. For practical purposes, we recommend at least four megs of RAM. But even if you don't use System 7, a hard disk and more memory are worthwhile upgrades; you'll never regret the resulting quantum leap in your Mac's performance.

System 7 makes the Plus, SE, Portable and the original Classics (but not the Classic II) run slow, so you may be better off sticking with System 6 on these machines (although the slowness doesn't bother everyone). If you really want System 7 but can't afford a faster Mac, consider installing an accelerator board (for more on that, see Chapter 2).

Only certain Macs can take advantage of System 7's virtual memory and 32-bit addressing features (see Chapters 2 and Chapter 3 for details).

If your Mac is a venerable 128K, 512K or 512Ke, you can adapt it to run System 7 by upgrading its logic board and installing a SCSI port. But that's so expensive, it probably makes more sense just to buy a new Mac instead, with System 7 and its manuals included in the price.

where to get system software *(SM/JK)*

The cheapest and easiest source for system software is probably your local Macintosh user group. One near us sells System 7 on ten disks with a manual for $25. You can also download it from bulletin boards and information services, or copy it from a friend or an Apple dealer (most will let you, if you provide the floppies).

System 7 features *(JK/CR)*

Here's a quick guide to the major features and capabilities System 7 gives you over System 6. The first three are covered in greater detail under *Tips on icons, files and folders* below. A slew of other, smaller enhancements are also described in the various tips sections later on in this chapter.

- The *stationery* option lets you turn any file into a template, automatically creating and opening a copy of it when you double-click the original.
- The *Find* command gives you more ways to look for files than System 6's Find File DA, and fetches what it finds, rather than just locating it.

- *File sharing* lets other Macs networked to yours use files and folders on your hard disk, and vice-versa. For more on file sharing, see Chapter 17.
- You can put anything on System 7's *more versatile* *menu*—a file, a folder, even a shared item on another Mac.

- In System 6, *fonts, sounds and DA's* are kept in special suitcase files and you need a utility program to install or remove them. In System 7, you just drag them onto the icon of your System Folder. And DA's don't have to be

accessed from the menu—you can put them anywhere, just like regular applications.

- *Increased memory capacity:* Macs using System 6 can only handle eight megabytes of RAM. System 7 allows some Macs to use up to one *gigabyte* (1024 megabytes) via 32-bit addressing (see Chapters 2 and 3).
- *Smarter memory handling:* System 7 uses more RAM, but it also handles memory allocation better, so you get fewer memory-related problems than in System 6.
- *Virtual memory* increases your Mac's memory by using disk space as RAM. It slows your Mac down, though, and won't work on all models. (For more about how this works, see the end of Chapter 3.)
- *TrueType fonts* produce smooth characters in any size on the screen and on any printer. They come with System 7, but you can also use them in System 6.0.7 or 6.0.8 (see Chapter 6 for more on TrueType).
- *Aliases* allow you to keep a file buried several folders deep, or even on another networked Mac, and still access it from the desktop, the menu or anywhere else you want.

The next four features aren't part of the system software itself; System 7 enables them to work, but you use them by executing special commands in applications that are designed to use them.

- *Publish and subscribe* works like an automatic cut-and-paste feature, allowing you to link data in two files (or two places in one file) so that when you change it in one place, it automatically changes in the other.
- *AppleEvents* allows you to use the features of one program on a file created in another program. For example, a database could send data to a spreadsheet program, which would send it back as a bar chart for use in one of the database's reports.
- *Data Access Language* (a.k.a. *DAL)* lets you access information from a database on another kind of computer, like a mainframe, without having to know that database program's commands.

- *QuickTime* is a system extension that lets you cut and paste still or animated images, with or without sounds. For example, you can paste a video clip into a word-processing document and then click on the clip to play it. *[Assuming, of course, that you're reading it on the screen. I don't know anyone who still reads things on paper, do you?—AN]* See Chapter 15 for more on QuickTime.

modular upgrades and Tune-Ups *(JK)*

System 7 is designed to be built onto, so that as new features come out, you don't have to install an entirely new system. QuickTime is one of these *modular upgrades*, which are generally available cheaply or for free from Apple dealers and user groups. By the time you read this, Apple will probably have introduced more of them.

Apple also periodically puts out *Tune-Ups* for System 7—utilities that fix bugs or enhance existing features. As of this writing, there have already been two, for Systems 7.0 and 7.0.1: Tune-Up 1.0 removed some problems that occurred when working with low memory, and Tune-Up 1.1.1 did that and also fixed a bug that can make files and folders disappear.

System 6 advantages *(CR/JK)*

System 7 has a lot more features, but System 6 still has some advantages:

- *Lower memory requirements:* In System 6 you can run a program on a one-megabyte Mac. If you use MultiFinder, it's actually possible to run two programs at once in two megs of RAM, which isn't true of System 7. System 6 itself only uses about 500 to 800K, as opposed to System 7's 1500K (although these figures depend on how many extensions, control panels, fonts and DA's you're running).
- *Compatibility with older software:* A lot of software was developed under System 6, and not all of it is compatible with System 7. Among old programs that do work under

System 7, few if any will be able to use application-based capabilities like AppleEvents and publish and subscribe (that's the difference between *System 7 compatible* and *System 7 savvy).* This means that if you've been using System 6, you may have to abandon some programs you really like, or spend a lot of time and money converting to newer versions of them when you switch to System 7.

- System 6's *Find File DA* isn't as flexible as System 7's *Find* command, but it's more useful when you want to find all the files with a certain name or part of a name. (Then again, you can always copy this DA from a System 6 Mac and use it with System 7.)
- *Simpler Finder:* System 6's no-frills Finder lacks the power of System 7's, but it's cleaner and simpler and uses up less memory.
- System 6 includes *MacroMaker,* a *scripting* program that lets you record commands and assigns keystrokes to them, so your Mac will perform the commands whenever you type the corresponding keystrokes. MacroMaker won't work with System 7 but, by the time you read this, Apple may have released *AppleScript,* a more sophisticated scripting program for System 7.

✎ *should you upgrade?* (CR)

If you've been using System 6 and are satisfied with your current system, there's no reason you have to upgrade. I know people who still use 512K Macs and System 3.2 yet still seem to lead happy and purposeful lives. *[It hardly seems possible, does it?—AN]*

But System 7 is the new standard. Most new programs you buy today will run under System 6, but eventually they won't, and you'll be stuck in the Software Dark Ages until you upgrade.

✎ *trying out System 7* (JK)

If you're currently using System 6, the best way to see what System 7 has to offer is to try it on your own

computer. If you've used MultiFinder in System 6, you'll find most of the basic stuff the same. Even if you haven't used MultiFinder, you still won't feel like you're learning to use a Mac all over again.

If you're torn between upgrading to System 7 and sticking with System 6, you don't have to commit to one or the other. If you've got more than one hard drive, you can keep one system on each and switch between them using the Startup Disk control panel.

If you only have one hard drive, get Switcher or System Picker. These freeware applications let you keep two or more System Folders on a single hard disk and tell your Mac which to boot up from.

❦ *System 7—freedom from freedom* (AN)

System 7 is obviously an improvement over System 6 in many ways, but in others it's definitely a step backward. My biggest complaint is the lack of customizability. Once again the omniscient beings at Apple have decided that they know better than you do what you want. (Oh thank you, Massa, for taking the burden of *choice* from my weary shoulders. I was so bewildered until I felt your firm hand at my back, guiding me down the one true path.)

I display my windows in list views (by date or by name) and thus have to deal with Apple's standard way of showing the date: *Wed, May 12, 1993.* In System 6, it was possible to change this format (among many other things), just on the off chance that you didn't really want to waste precious screen space being told that May 12 was a Wednesday, or that a file was created in 1993—rather than, say, 1893.

(Come to think of it, how are we supposed to know if it's 1993 *AD* or 1993 *BC?* Apple has foolishly failed to provide this important information. Maybe in System 8 list views we'll get dates that look like this: *Wednesday,*

May 12, 1993 AD (Gregorian calendar), the moon one day short of its third quarter, rain predicted in the eastern United States, celebrities born on this date: Florence Nightingale, Yogi Berra [click here for more information]. All Macs will come with five-foot-wide screens, so they can display the *full* date.)

In its tireless pursuit of wasted screen space, System 7 also puts those stupid triangles to the left of file names in list views. To save you hours of anguished decision-making, you get the stupid triangles *whether or not* you ever use them.

What made things like that alterable in System 6 was a part of the Finder called the LAYO resource. If you didn't want to use ResEdit to tackle LAYO directly, a third-party utility called Layout did that for you, and made it easy for you to show dates as 5/12/93 (and several other ways as well). By accessing LAYO, Layout let you change the width of columns in list views (so you could, for example, see file names complete instead of truncated). It let you decide on the size, shape, location and View of the window you get when you create a new folder and open it. Etc., etc., etc.

Layout is still around for System 7, but it can hardly do anything useful, since Apple, having finally figured out what everybody wants (colored labels, outlines within windows, aliases all over the place) has removed the LAYO resource from System 7. Its pathetic substitute, the Views control panel, provides maybe 1% of the options Layout offered under System 6. There's nothing third-party developers can do about all this, because without the LAYO resource, customizing how the Finder puts information on the screen is a risky business.

I would have just stayed with System 6, except I needed version 6.0.7 to run my LaserWriter IIg, and 6.0.7 is as buggy as a New York apartment with peanut butter smeared on its walls. (As an avid conservationist, I've

recycled that image from an old review of Word 3. Waste not, want not.) So I'm stuck with System 7's inflexibility.

By the way, why is it 6.0.7, instead of simply 6.07? Were the people who name system versions home sick the day they covered decimals in fourth grade?

faking System 7 (SM/JK)

If you're using System 6 and are tempted by System 7 but don't want to switch, there are programs that give you some similar features without upgrading.

- Layout, a shareware program, lets you customize Finder views much more extensively than System 7 does. A commercial version is available in Norton Utilities ($150 list, from Symantec).
- DiskTop 4.01 ($100 list, from CE Software), MultiMaster (in Now Utilities, $130 list from Now Software) and OnCue II ($100 list from Icom Simulations) give the same sort of quick access to files as System 7's menu. DiskTop also lets you select files from different folders simultaneously (to copy them, say) and does sophisticated searches.
- Set Paths, GooPanel (freeware) and other init managers let you organize system files by creating folders within the System Folder.
- SuperBoomerang (in Now Utilities) compresses long names to fit into list boxes better (among other features).
- Virtual 2.0 and 3.0 (both $200 list, from Connectix) give the Mac II family and Macs using 68030 chips access to up to 14MB of virtual memory—and Virtual 3.0 lets you access 16MB of physical RAM.
- Maxima ($130 list) gives the Mac II family access to as much as 14MB of physical RAM and Optima/32 ($270 list, for Mac IIs, the LC II and the SE/30) brings 32-bit addressing to System 6 (under the Finder only, though—MultiFinder isn't 32-bit clean). Both are from Connectix.
- POWERicons ($30 list, from Magic Software) lets you create aliases.

Many of these utilities are discussed in more detail in Chapter 7; some of the memory-related ones are discussed in Chapter 3.

✎ using 6 and 7 on the same network (CR/JK)

Macs using System 6 and System 7 can share a network without any problems. System 6 Macs with AppleShare workstation software can even share the System 7 Macs' files (not the other way around, though).

If the Macs share a LaserWriter, they must all have the same version of the LaserWriter driver; otherwise the printer will spend two minutes reinitializing every time it's used by a Mac with a different driver. Use the Installer on System 7's Printing disk to install the latest versions of the LaserWriter driver, Backgrounder, PrintMonitor, etc. on everyone's machines.

Installing a new system

✎ copying system software disks (CR/JK)

Be sure to make backup copies of the floppy disks that system software comes on, in case something happens to the originals. If possible, make the backups under System 6, because System 7's Install 1 disk won't copy properly if done under System 7. *[That's a nice feature.—AN]* Or use Apple's DiskCopy program; it's available at Apple dealers.

✎ use the Installer (CR)

When installing a new system, don't just drag copies of system files off the installation floppies—use the Installer program instead. The Installer automatically handles a lot of things you couldn't or wouldn't want to do yourself, like optimizing the software for your particular Mac.

Be sure to start up your Mac from the disk containing the Installer (Install 1, System Startup or System Tools, depending on what version you're installing). That way the installation won't be hampered or interrupted by the extensions and control panels that run on your usual startup disk.

installing on an empty hard disk *(JK)*

It's easy to install a system on a hard disk that doesn't have one yet. Just hook the drive up to your Mac and turn them both on, with the Install 1, System Tools or System Startup disk in the Mac's floppy drive. Then run the Installer.

preparing to upgrade from System 6 *(JK)*

If you're upgrading from System 6 to System 7, run the Compatibility Checker first (it's on the *Before You Install...* disk). It scans all the software on your hard disk, tells you which items are potentially incompatible with System 7 and offers to put them in a folder called *May Not Work With System 7*.

(The *Before You Install System 7* disk also contains a HyperCard stack that demonstrates the new features. You might want to run it after you install System 7, so you can try things out as you run the demo.)

You should also update your hard disk's driver before installing System 7 (especially if you plan to use virtual memory). If you have an Apple hard disk, just restart your Mac with the System 7 *Disk Tools* disk, run the HD SC Setup program, and click the *Update* button.

If you're using a third-party hard disk, you need to use the setup program that came with it, but there's a chance that it won't be System 7-compatible. If you're not sure, call the manufacturer to find out; if it isn't, the company should give you one that is.

Lastly, run the Disk First Aid program on the Disk Tools floppy in your System 7 installation set. It will diagnose your drive for problems and if there are any, repair them. If there are problems it *can't* repair, you should back up all your data, reformat your hard drive and then restore its contents before you install System 7.

If you're installing System 7.0 or 7.0.1, be sure to get Tune-Up version 1.1.1 (or later) from an Apple dealer—you'll need it after you install the new system.

installing System 7 *(JK)*

Before installation, make sure you have at least four megs free on your hard disk, and make backups of *all* your files, including your existing System Folder. (If you're upgrading from System 6, follow the instructions in the previous entry first.)

Then proceed as follows:

1. Disable your old System Folder by dragging the Finder out of it. Then rename the folder *old system stuff* (or whatever), so a new System Folder can be created. Make sure there aren't any other System Folders on your disk; if there are, delete them.
2. Restart your Mac and immediately insert the Install 1 disk into the floppy drive. Then run the Installer. Click the *Easy install* button, or see *custom installing* below for ways to avoid installing files you don't need.
3. When the Installer has finished, restart again, and you'll be running under System 7.
4. Drag all your non-Apple extensions, control panels, drivers, preference files, etc. from the *old system stuff* folder onto the new System Folder's icon—*not into its window*—being careful to avoid replacing files that already exist there. (Ideally, you should add the extensions and control panels one at a time, restarting after each one to be sure it's not causing any problems.)
5. If you keep fonts, sounds and DA's in suitcase files and manage them with a font/DA program like Suitcase, drag

them to your new System Folder's *open window,* so they'll stay intact and the program can still access them.

If you'd installed extra fonts, DA's or sounds in your old System *file,* double-click its icon and a window will open, allowing you to select them individually. Drag them from there onto the new System Folder icon.

6. Drag the *old system stuff* folder to the Trash.
7. If you're installing System 7.0 or 7.0.1, run Tune-Up 1.1.1.

❦ *reinstalling System 6* (JK)

You can install System 6 over an existing System Folder and the Installer will automatically copy all your old System file's fonts and DA's into the new one. But if your old System file was damaged, as often happens over time, that damage will probably remain in the newly installed System.

So before running the Installer, start up from the System Tools or System Startup floppy, drag your System file out of the System Folder and copy a fresh System file into it from the floppy. Next *bless* your new System by holding down ⌘ and Option and double-clicking the Finder file. Then restart with the floppy and run the Installer. Lastly, use Font/DA Mover to copy any extra fonts and DA's from your old System file into the new one, and trash the old System file.

❦ *custom installing* (JK)

When you run the Installer over an existing System Folder as described in the previous entry, the *Easy Install* option just updates your existing system files.

When you run the Installer on a brand new disk or one with a disabled System Folder, *Easy Install* gives you all the software it thinks you might need, including drivers for every Apple printer. To avoid loading up your system with extra files, choose the *Customize* option instead. Then select the software you want from the list box that appears.

You can pick the right driver for your printer, decide whether to install file sharing software and choose between installing a system that will work on any Mac model or just your own.

✎ *installing a second system* (JK)

It's usually not recommended to keep two systems on one hard drive, but that *is* a great way to install System 7 and still keep one foot in System 6 (I've worked that way for almost a year, switching back and forth between systems without any problems). To tell your Mac which system to boot up from, you'll need System Picker and Switcher (both public-domain programs).

Before you install a second system, copy your current System Folder onto another disk and delete it from your startup disk. Then copy it back when you're through with the installation.

✎ *older system version numbers* (SA/CR/JK)

You have to use the compatible versions of the System and Finder, so you shouldn't update one without updating the other (using the Installer guarantees this, another reason to use it). Here are the pairs that go together, starting with the last set developed for the 128K Mac:

System	Finder
2.0	4.1
3.2	5.3
4.0	5.4
4.1	5.5
4.2	6.0
6.0–6.0.3	6.1
6.0.4	6.1.4
6.0.5	6.1.5
6.0.7	6.1.7
6.0.8	6.1.8

In its inimitable fashion, Apple gave some of these pairs a different version number from *either* the System or the Finder. For example, Apple called System 4.2 and Finder 6.0 together System Tools 5.0. Apple eventually ironed out its numbering system, called System 6.0 and Finder 6.1 System Tools 6.0. Now all you have to do is make sure that the main number of the System and the Finder match and minor upgrades to either one will then be compatible with the other file.

The best way to find out which versions of the System and Finder you're using is to select their icons in the System Folder and hit ⌘I (or, in System 6, select *About the Finder* from the menu).

mostly for beginners

Tips on icons, files & folders

finding files and folders *(JK)*

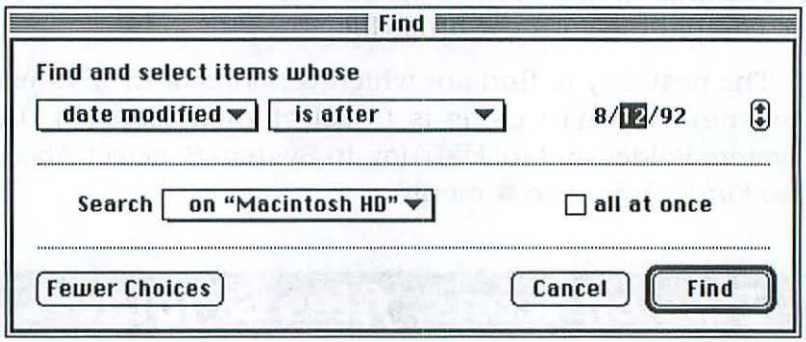
If you're not sure where a file or folder is on a disk, you can find it using the *Find* command on the File menu in the Finder. Just type the item's name (or as much of it as you can remember) into the Find dialog box and click the *Find* button.

mostly for beginners

There may be several items on disk whose names contain what you typed into the dialog box (which is called the *search string).* If the first item that's found isn't the one you wanted, use the *Find again* command (⌘G) to search for the next one and so on.

Even if you know where a file is, the *Find* command can help you get to it faster than you could by manually opening all the folders that enclose it. And it only opens the folder that actually contains the item you're looking for, rather than littering your screen with the windows of all the folders enclosing it.

If you click the *More Choices* button, a larger window opens (like the one shown below); it lets you look for a file by many other criteria than just its name. For example, if you can't remember what a document is called but know it's one of a handful that you've worked on in the last few days, you can search for all the files whose modified dates are within that period.



You can also narrow the search to a specific disk, folder or set of folders, or have the Mac display all the found files at once instead of using the *Find again* command. But I've found narrowed searches to be very unreliable—I rarely find files this way, even when I know they're there. And the *all at once* option can only display a limited number of items if they're in different folders (System 6's Find File DA handles this better). Third-party programs like DiskTop do a better job at both of these tasks.

aliases *(CR/JK/Nicholas Lavroff)*

Aliases are one of System 7's most useful innovations. An alias is a copy of an item's icon that looks just like the item itself but is really just a remote control; when you double-click on the alias, you open the original.

You can make aliases of documents, applications, folders, even shared files on other computers. And since an alias isn't an actual copy, but just a remote control, it only

takes up about one K on disk, even though it may represent a file or application that's several megs in size.

Making an alias is simple: you just select an item and then choose *Make Alias* from the File menu. The alias will appear next to the original, with its name in italics. You can then rename it or move it anywhere you want (the name stays in italics, though).

You can move or rename the original too, and the alias will usually keep track of where it went and what it's called. (Obviously, the original has to be somewhere accessible to your Mac, or it won't be able to open it.)

You can make more than one alias for an item, and put them wherever they'll be handy. Since the menu is almost always accessible, many people put aliases there. Even the system software does that, since the *Control Panels* command on the menu is nothing more than an alias for the Control Panels folder in the System Folder.

using aliases *(CR)*

You can't always keep applications out on the desktop or in your main hard disk window, because they often demand folders of their own, containing dictionaries and other kinds of support files. But you can still access them easily through aliases.

For example, you might have the Word application file inside a Word folder inside a Word Processing folder inside an Applications folder; but you can launch it without having to dig through all those folders by putting an alias of it on the menu or out on the desktop.

What's good for applications is good for folders or documents too. I keep aliases of letterhead and envelope templates right on the menu. I also keep aliases of FileMaker Pro documents I use frequently right inside my Applications folder with FileMaker Pro so I don't have to go to another folder to open them.

[If you frequently go back and forth between two folders, put an alias of each inside the other.—JK]

You can also make aliases for the Trash, so you don't have to hunt for it under open windows. Put Trash aliases inside any of the folders you use frequently, and you can just drag files into the Trash alias when you're in that folder window.

using aliases to mount shared disks *(CR)*

Normally, to mount a shared disk or folder on your Mac, you have to open the Chooser, choose the AppleShare icon, select the server, type your name and password, click the *OK* button, select the shared item you want, click *OK* again, and then close the Chooser. But you can make an alias for a shared disk's icon that will store most of these steps.

First, mount the shared file as you normally would. Then select its icon on your desktop and choose *Make Alias* from the File menu. Then you can store the alias on the menu or anywhere you want. To mount the shared disk the next time, just double-click the alias (or select it from the menu) and hit Return (or click *OK*) in the dialog box that appears.

using aliases to catalog files *(Nicholas Lavroff)*

If you sometimes have trouble remembering which floppy disk or cartridge you've backed up a file on, here's an easy way to catalog them. Make aliases of every file on every backup disk and put them in a folder on your hard disk (at 1K per alias, they won't take up much room).

When you double-click on one of the aliases, the Mac will ask—by name—for the disk that contains it. (Be sure to physically label your backup disks with the same names they have on the desktop, or you still won't be able to find the right disk.)

changing icons (JK)

In System 7, you can change the icon for any disk, file or folder. Select the item whose icon you want to change and choose *Get Info* from the File menu. The item's icon will appear in the upper-left corner of the Get Info window. Click on it and a box will appear around it. At that point you can paste in a new icon (you can also copy the icon onto the Clipboard, if you want to paste *it* somewhere else).

You can use any graphic for this, and the Mac will automatically resize it to normal icon size. (For this reason, large graphics usually don't make good icons—they become ugly blobs when they're shrunk way down.) The icons will only change in Icon view and Small Icon view, not in list views.

You can also change an item's icon to a generic one for that type—a blank folder, document, etc.—by selecting the existing icon and hitting ⇧⌘X.

naming and renaming icons (CR/SA/JK)

mostly for beginners

When you create a new item in the Finder—either a new folder with ⇧⌘N, an alias using *Make Alias*, or a copy of a file or folder with ⇧⌘D—the new item's name is automatically selected; to rename it, just begin typing.

To rename an existing item in System 7, you have to click on its name and wait for a box to appear around it. You can minimize this wait by going into the Mouse control panel and setting the double-click speed to its fastest—that's what the delay is based on. Or, if the item is already selected, you can select its name immediately by pressing Return or Enter. When you've renamed the icon, press Return or Enter again to deselect the name.

If you rename an icon and change your mind while the icon is still selected, you can use the *Undo* command (⇧⌘Z) to revert to the original name.

✎ *don't rename active files, etc.* (JK)

Be careful to avoid moving or renaming files on the desktop while they're open in an application. That goes for the disks and folders that contain the files too.

If you do, when you try to save the file, the application won't be able to find the folder it belongs in. Instead, it may actually create a new folder with the old folder's name, and save the file there. Later, when you open the renamed/moved file, it won't have any of the changes you saved the last time you were using it. If you don't notice this right away, you'll wind up with two modified files, neither of which contains all your work.

✎ *lowercasing file names* (AN)

Since every inch of your screen counts, there's no sense in capitalizing an item's name except when necessary. Capital letters take up much more room than lowercase ones, and once you get used to the lowercase look (you can use the entry titles in this book for practice), file names with gratuitous caps look clunky and old-fashioned.

✎ *the drag-launch* (Nicholas Lavroff/JK)

In System 7, you can open a document from the desktop by dragging its icon onto the icon of any application capable of opening it. This doesn't always work—depending on the application and the document type, you may still have to open it from the application. But it's useful if, say, you have a text file that you want to open with Word (you could even keep an alias of Word ready on the desktop for this very purpose).

✎ *dragging duplicates* (SA/JK)

To move a *copy* of a file to a different place on the same disk (instead of moving the file itself) hold Option while you drag it; the copy appears in the new spot with the same name as the original—without *copy* tacked on the end,

as happens when you use ⌘D to copy a file. (We mentioned this in the *Guide for beginners* in Chapter 1, but thought it was worth repeating here.)

replace folder contents, not folders *(SA/AN)*

If you drag a folder from one disk to another and the destination disk already has a folder on it with the same name, the contents of the folder you're dragging completely replace the contents of the existing folder. This can be a big problem if the original folder (on the destination disk) contained files that the replacement folder doesn't.

To be safe, never replace a folder with a folder. Instead, work with folder *contents*. Open the folder you were going to drag, use ⌘A for *Select All* and drag all the items into the folder on the destination disk. If any of the files you drag have the same names as files already in the folder, you'll be asked if you want to replace them—but any additional files in the destination folder won't be touched. (Of course you're also asked if you want to replace the entire folder with another one with the same name, but you're more likely to mindlessly click *Yes* in that case than if you're being asked about individual files.)

locking files *(SA/DC)*

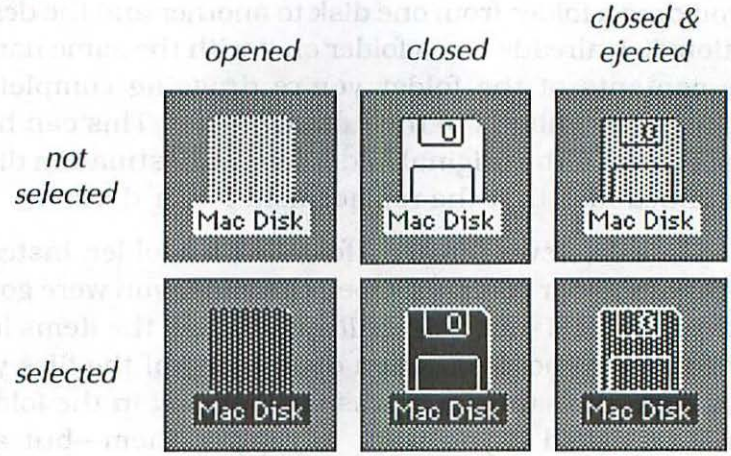
To lock a file, select it on the desktop, choose *Get Info* from the File menu (or hit ⌘I) and click in the *Locked* checkbox. To unlock it, just click in the checkbox again. Locked files can't be deleted or modified from within an application, although you can use *Save As* to make an unlocked, editable copy.

On the desktop, it's easy to tell if a file is locked without opening the Get Info dialog box—if it's locked, you won't be able to select the icon's name for editing.

shades of gray (SA/KF)

mostly for beginners

The way a disk's icon looks on the desktop tells you whether it's selected or not, whether its window is open or closed, and whether it's in the disk drive or has been ejected:



ejecting floppies (SA/CR/AN)

shortcut

The best way to eject a floppy disk is to drag it to the Trash. (We've heard people gasp the first time they see someone do that, because they think it will erase the disk, but in this case, the Trash metaphor isn't strictly adhered to).

The commands below eject a disk but leave its dimmed icon (or *ghost)* on the desktop:

- ⌘E ejects the selected floppy(ies). This is the keyboard equivalent of the *Eject* command in the File menu.
- Shift⌘1 ejects the floppy in the (first) internal drive
- Shift⌘2 ejects the floppy in the external (or second internal) drive
- Shift⌘0 ejects the floppy in a second external drive

Using the *Eject* button in an Open or Save As dialog box also ejects a disk and leaves its ghost on the desktop.

If you don't want the ghost, drag the floppy to the Trash—or use the *Put Away* command (⌘Y), which does the same thing. In System 6, the equivalent command is Shift Option ⌘E.

disk ghosts (SA/CR/JK)

If you're going to be reinserting a disk soon, it may be worth leaving its ghost on the desktop when you eject it (the ghost will save you time, because the Mac won't have to read the contents of the disk to create its windows all over again). Another reason to leave a disk ghost on the desktop (provided its window was left open) is if you're comparing its contents with another floppy's and only have one floppy drive.

If neither of these situations applies, drag the ghost to the Trash. Aside from the clutter, disk ghosts take up memory, and the Mac will invariably ask you to reinsert the disk at some inconvenient moment. (When it does, just type ⌘. and the Mac will usually stop pestering you.)

You should avoid leaving a floppy's ghost on the screen and then using the disk in another Mac; when you bring it back, the first Mac won't recognize it as the same disk you ejected. In some situations, if you shut down your Mac or get a system bomb with a disk ghost on the screen, the floppy that it represents will be rendered unusable for any purpose, even for being erased!

Sometimes you'll drag a disk to the Trash and its ghost will remain on the desktop, or will bounce right back up to where it was. This often means there's a file open on the disk that you need to close. If you're sure there are no documents open on it, try closing any programs you were using with files on that disk; some programs (like TeachText) suffer from separation anxiety and won't let go of a document even after it's closed. Otherwise, the culprit is usually a suitcase file that you've opened with Suitcase or MasterJuggler.

Tips on windows

❦ moving inactive windows *(DC/SA/AN)*

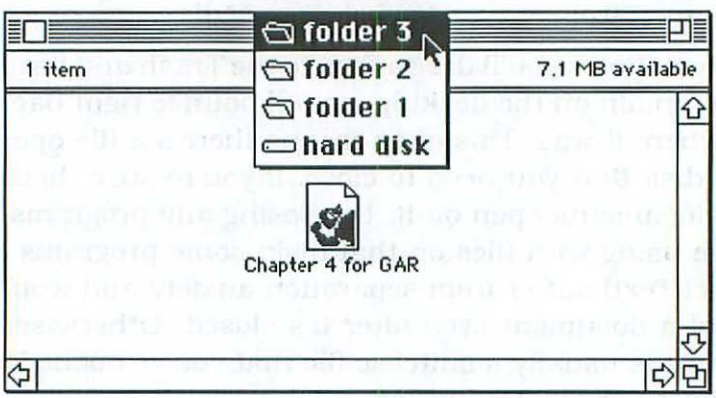
To move an inactive window (one that's not selected), just hold down ⌘ while dragging it. This trick is useful if you want to shift a background window to see something but want to keep the currently active window on the top of the pile.

❦ locating buried windows *(SA)*

If you have a lot of windows open on the desktop, sometimes the one you want gets buried. If you can't see a folder's window but can see its dimmed icon, just double-click on the icon to bring its window to the top of the pile.

❦ pop-down folder hierarchy *(Nicholas Lavroff)*

If you've got a folder's window open on the desktop, there's an easy way to find out where it is in the hierarchy of folders on your disk. Just hold down ⌘ and click down on the window's name in the title bar. A pop-down menu like the one below will appear, showing all the folders that contain the open one. (This only works for the active window, so if the window you're interested in isn't active, you have to click on it first.)



You can open any of the folders on the menu simply by selecting its name. If you hold down Option while you do this, the first window will close as the second opens.)

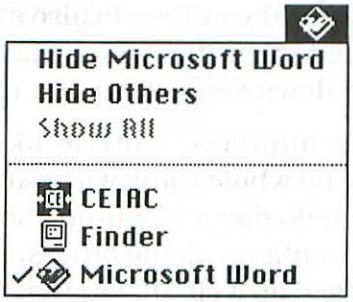
automatic window closing with Option *(AN/SA/JK)*

The Option key can help you keep your desktop from being cluttered with windows. Hold it down when you're double-clicking on an item in a window in the Finder, and the window will close as the item you clicked on opens. You can use this method to paw your way down through nested folders, closing each one as you open the one within it.

To close all the desktop windows without clicking in each close box, hold down Option while you close any window—every other window on the desktop will close too. The Option key also helps you hide application windows—see the next entry.

hiding & seeking application windows *(CR/JK)*

System 7 offers several ways to hide application windows without actually closing them. To see what's behind the windows of the application you're currently using, select *Hide [application name]* at the top of the Application menu (the one at the right end of the menu bar), and all the windows for that program will disappear. (The command's name changes to always show the active application's name, as in the menu below.)



If you want to hide the windows *behind* a document you're working on, select *Hide others;* the windows in the Finder and all other open applications will disappear, so you can focus on the file you're working on.

When you're switching between applications (including the Finder), holding down Option as you select the next application you're moving to will hide the windows of the application you're leaving.

To bring back a particular application's hidden windows, just select its name from the Application menu. To bring back *all* the hidden applications' windows, select *Show All.*

Hidden windows are still open, they're just not visible. So when you bring them back, they all reappear just as they were before being hidden, but much faster than if you'd actually closed them.

✎ *the best way to view files* (AN)

View windows by name when they contain mostly folders (so the names stay in the same place on the list and can be found easily) and by date when they contain mostly files (so the ones you worked on most recently will be at the top of the list). Viewing by icon is cute and Maclike, but infinitely less efficient than viewing by name or by date.

✎ *multilevel outline views* (JK)

In System 7 list views, you can see a folder's contents displayed in an outline below it by clicking the triangle next to it. If you want the outline to also show the contents of folders contained *within* the folder whose triangle you're clicking on, hold down Option when you click the triangle.

If you've got a multilevel outline like this open and want to collapse the whole thing without clicking on each folder's triangle, hold down Option and click on the triangle of the folder that contains all the others. All the other folders will be collapsed as well. (If you just click the triangle

without holding down Option, the outline will disappear, but when you expand it again, all the contained folders will still be expanded.)

the unmodified date (SA)

Sometimes just opening a document to look at it is enough to change the *last modified* date that appears in list views and in the Get Info box. So be aware that the file may not have been actually modified on that date.

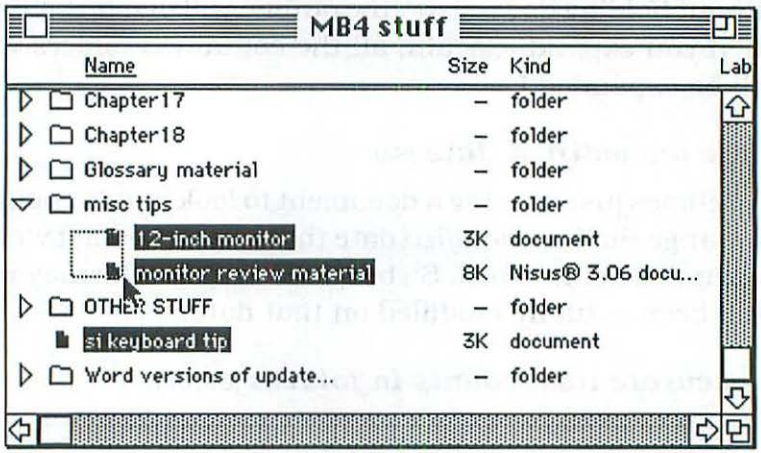
accurate item counts in folders (CR/JK)

List views normally show you the sizes of files but not of folders. System 7 will calculate and display folder sizes if you want it to (you do that in the Views control panel), but this takes the Mac a while and will slow down opening windows or returning to the desktop.

In icon views, the line under a window's title will tell you how many items it contains, but it counts a folder and its contents as one item. The best way to find out how many items it actually contains, including files *within* folders, is to *Get Info* on it with ⌘I. (This only works in System 7; under System 6, *Get Info* doesn't count items within folders.)

selecting items in list views (CR/JK)

In System 7, you can select groups of items in list views by dragging a selection rectangle around them, just as you've always been able to do in icon views. By using outline views and shift-clicking (or shift-dragging) you can also select items from different folders at the same time, as long as they all appear in the same overall window (see the illustration at the top of the next page).



using labels *(CR/JK)*

System 7 lets you attach labels to files and folders, so you can identify all the ones that belong to a particular project or that share some status the Mac wouldn't normally recognize. For example, people sharing a Mac can label their files with their own names to keep track of what's whose.

To give a file or folder a label, select it in the Finder and then choose a name from the Label menu. If you've got a color monitor, each label has its own color, which also gets applied to the selected item. You can change the names and colors to whatever you want in the Labels control panel.

When you choose *by Label* from the View menu, items in the active window are sorted according to the order their labels appear on the Label menu, not by the labels' alphabetical order. For example, if the top label on the menu is *Hot* and the bottom label is *Archive*, items with the Hot label will be sorted before items with the Archive label.

keeping file names at the top of lists *(SA/JK)*

File names are alphabetized both in list views on the desktop and in list boxes inside Open or Save dialog

boxes. If you know the Mac's alphabetizing rules, you can force any document or folder you want to the top of any list by changing its name slightly.

Alphabetic characters are sorted just the way you'd expect, and there's no difference between capital and lowercase letters.

Numbers come before letters, so *9* is sorted before *A*. Punctuation marks and other symbols are sorted before, after or between the numbers and letters, according to their ASCII codes. Here are the first sixteen characters, in order; putting any one of these in front of a file name will jump it to the top of the list, even ahead of numbers:

Spacebar ! " (the straight quote mark) # $ % & ' (the straight apostrophe) ( ) * + , - . /

In System 6, you can use these symbols to keep *groups* of files together. For example, you might put an exclamation mark in front of the names of all documents relating to one project, and an asterisk in front of the names of documents relating to another project. (In System 7, it's easier just to assign labels to files that all relate to the same subject.)

Option characters (the ones you get by holding down Option or Shift Option when you type) may be sorted before, after or between alphabetic characters, and the order is different in desktop windows than it is in list boxes inside dialog boxes. To make it easy on yourself, don't use option characters in file names.

sorting numbered file names *(SA)*

The Mac isn't very smart about sorting numbers—for example, 10 comes after 1 and before 2. If you want numbers to show up in numerical order, use a space in front of the single digits, but none in front of the double digits:

Without space	With space
1	1
10	2
11	3
12	4
2	10
3	11
4	12

This works whether the numbers are the first (or only) characters in the file name or if they're embedded in the file name:

Without space	With space
Chapter 1	Chapter 1
Chapter 10	Chapter 2
Chapter 11	Chapter 3
Chapter 12	Chapter 4
Chapter 2	Chapter 10
Chapter 3	Chapter 11
Chapter 4	Chapter 12

If your list includes three-digit numbers, you'll need to put two spaces in front of the single-digit numbers, a single space in front of the two-digit numbers, and no space in front of the three-digit numbers.

selecting the desktop *(JK)*

To get to the Finder from an application, you can just click anywhere on the desktop. That'll put you back in the Finder and will re-activate whatever the active window was when you left.

But sometimes you want to select the desktop itself (in order to rearrange its icons with the Special menu's *Clean up* command, for example). The best way to do this is to click on any icon on the desktop (the startup disk or Trash icon will do) or type Shift⌘↑.

selecting icons from the keyboard (JK)

In System 7, you can find and select any file you want on the desktop or in its windows without having to hunt through a zillion icons with the mouse. Just select the window (or the desktop) and type the first few letters of the file's name.

moving files into list-view windows (DC/JK)

Be careful when you drag a file to a window that's displayed in any list view, especially if a number of the names on the list are folders rather than files. It's easy to accidentally select one of the folders when you point to the destination window, and then the file you're moving will be put inside the folder rather than out in the larger window where you meant it to be. You can have quite a time trying to find it after that.

There are two ways to avoid this problem. One is to resize the window you're moving into so there's space below the bottom file in the list, and drag the file there. Or you can scroll to the top of the list box and drag the file to the part of the window just below the title bar (the rectangular space where the words *Name, Size, Kind* and so on appear). Since no icons can appear there, there's no danger that the files you're dragging will disappear into a folder.

automatic scrolling inside windows (JK/CR)

Windows in System 7 scroll automatically, so you don't have to resize them when you're moving a file from one place to another inside the same window. For example, if you select a file and want to move it into a folder that's out of view in the same window, drag the file to the edge of the window and the window will scroll in that direction.

The scrolling only works if you hold the pointer in the right spot, though. To scroll to the right or down, it has to be in the scroll bar on that side of the window. To scroll upward, hold it in the area below the title bar, where the column headings are.

You can also use automatic scrolling to draw selection boxes around items that are out of view. When you're doing this, the window scrolls faster if you drag the pointer beyond the window's edge.

🍎 *cleaning up windows and the desktop* *(CR/JK/SA)*

There's an invisible grid in icon-view windows and on the desktop that you can use to align your icons neatly. Use the *Clean Up* command on the Special menu to do the straightening. The command reads *Clean Up Desktop* or *Clean Up Window*, depending on which is selected, and shuffles all the icons onto the nearest grid points, without changing the basic arrangement they were in.

If you don't care about that arrangement, you can force the icons into neat rows and columns by holding down Option while you choose *Clean Up*. On the desktop, this changes the command to *Clean Up All* and lines the icons up against the right edge of the screen. In windows, the command's name depends on whatever list view you had last chosen for that window (see the next entry).

If you hold ⇧⌘ down while you drag a loose item, it'll snap to the nearest grid point when you release it. You can also use the checkboxes in the Views control panel to make icons automatically snap to a straight or staggered pattern along the grid. (The benefit of a staggered pattern is that long file names are less likely to overlap.)

🍎 *arranging icons by name, kind, etc.* *(JK/CR)*

You can sort items in icon views by any of the categories under the View menu, including the ones that normally give you list views *(by Name, by Size,* etc.).

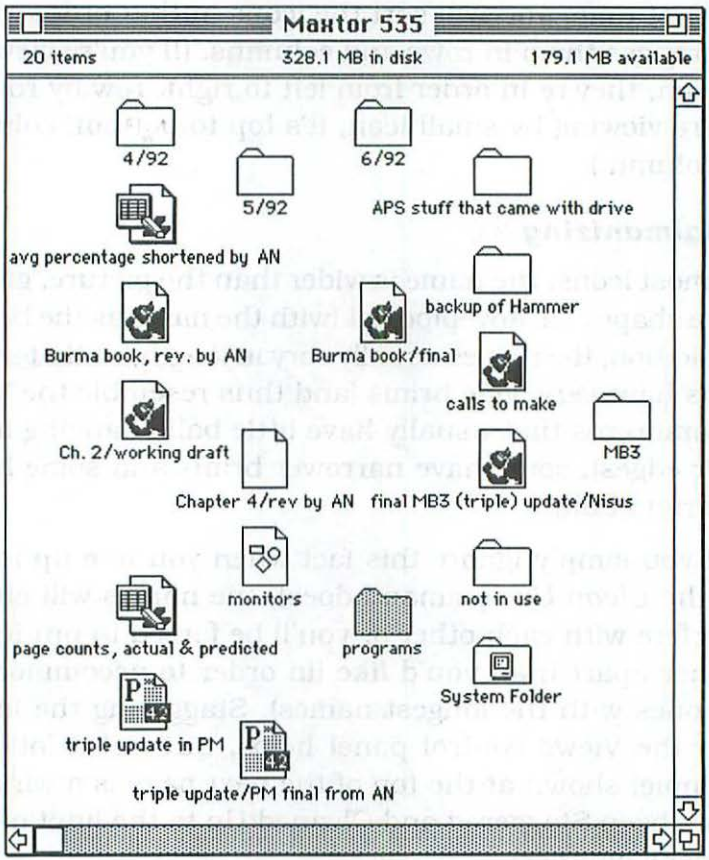
With the window selected, choose the sort order you want from the View menu. Then go back and choose *by Icon* or *by Small Icon*. Lastly, hold down Option and choose the *Clean Up* command from the Special menu. It will read *Clean Up by Name*, or by whatever category you selected

the first time, and will sort the icons in that order while it arranges them in rows and columns. (If you're viewing by icon, they're in order from left to right, row by row; if you're viewing by small icon, it's top to bottom, column by column.)

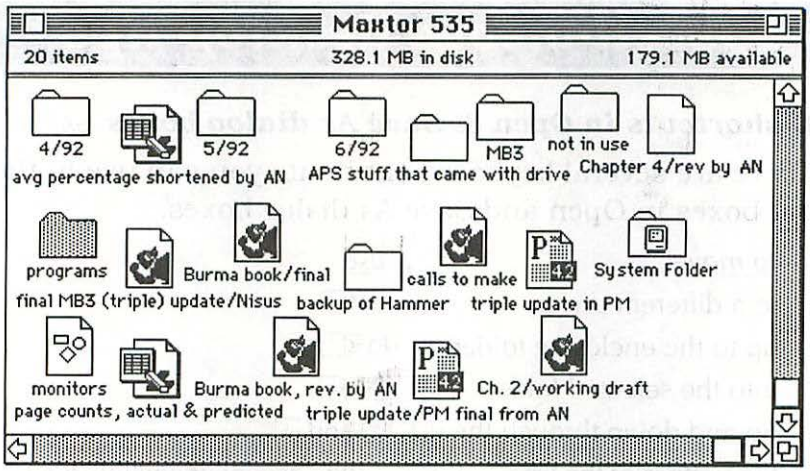
Naimanizing *(AN)*

On most icons, the name is wider than the picture, giving it the shape of a stovepipe hat (with the name as the brim). In addition, the names usually vary in length, so that some icons have very wide brims (and thus resemble the kind of sombreros that usually have little balls hanging from their edges), some have narrower brims and some have no brim at all.

If you simply ignore this fact when you line up icons (as the *Clean Up* command does), the names will either interfere with each other or you'll be forced to put icons farther apart than you'd like (in order to accommodate the ones with the longest names). Staggering the icons with the Views control panel helps, but not a lot. For example, shown at the top of the next page is a window that's been Staggered and Cleaned Up to the limit of the Finder's abilities:



Just look at that wasted space! Tsk tsk tsk! (I have a friend who actually pronounces it that way—*tisk tisk tisk.)* Well, don't despair—there *is* a better way. Just move the brimless icons around to sit on the ones with the long brims, and tuck brims underneath each other. You'll get something that looks like the one shown at the top of the next page.



Quite a difference, isn't there? My goodness yes.

This technique of tucking the name of an icon under the names of its neighbors is known as *Naimanizing (NAY-mun-eye-zing)*. The origins of this term are lost in the mists of time. Some scholars suggest that it's a play on the word *name*, but that wouldn't account for the spelling. Others trace it back to the famous 17th-century explorer, philosopher and bon vivant Balthasar Naiman. The debate goes on.

In any case, the ancient craft of Naimanizing obviously has a lot to offer anyone who wants to maximize desktop space. But be aware: Naimanizing is an art, not a science, and you can't expect to discover its secrets in a day.

(I have to confess—I've pretty much gone over to list views. Viewing by Icon, even when Naimanized, seems awfully inefficient to me. But some people love to see all the little icon designs, and for them, Naimanizing is the way to go.)

[Another technique that's very space-efficient and orderly is to view by Small Icon and then Clean Up by Name.—JK]

Yeah, that's not bad, but it still doesn't match the incredible tightness and—dare I say it?—ineffable beauty of a window that's been hand-Naimanized by a master.

Miscellaneous desktop tips

shortcuts in Open & Save As dialog boxes (SA/JK)

There are several keyboard shortcuts you can use in the list boxes in Open and Save As dialog boxes:

to move	use
to a different drive	⌘→
up to the enclosing folder	⌘↑
into the selected folder	⌘↓
up and down through the list	↑ and ↓
the bottom of the list	` (the accent grave/tilde key)

In Open dialog boxes, hitting a key selects the first folder or file name beginning with that character (or the next nearest character). If you type quickly, you can select a name by typing the first few letters of its name. (If you type slowly, each letter will be interpreted as a single letter and you'll keep jumping around the list.)

This works for selecting folders in Save As dialog boxes too, as long as the list box is selected. You can select the list box by clicking on it or hitting Tab, which bounces you between the list box and the text box where you type in the name of the file you're saving.

opening multiple files (SA/AN)

You can open several applications or documents at once by selecting them all and then double-clicking on any one of them. (They all have to be in the same window, though.)

selecting text box contents (SA)

When a dialog box opens with a single text box in it, usually the text in the box is selected. If it isn't, and you want to replace it, you don't have to drag across the text to select it, or backspace all the way across it to get rid

of it. Just hit Tab to select all the text in the box, then type in the replacement text.

selecting files with the keyboard *(CR)*

You can select items in Finder windows and on the desktop in alphabetical order by pressing Tab. You can also type the first letter of an item's name to select it.

switching between applications *(CR)*

There are a couple of other ways to move from one opened application to another besides using the Application menu at the right end of the menu bar.

- If you're on the desktop and can see the application's icon (it will be gray because the application is running), double-clicking on it will return you to the program.
- If the application you want has a window open, click on it. The window will move to the front and the program will be activated.

emptying the Trash *(CR/JK)*

Under System 7, the Trash holds onto its contents even if you shut down your computer. To flush the Trash of its contents, you have to choose *Empty Trash* from the Special menu.

When you put files from a floppy into the Trash, then eject the floppy, the Trash icon stops bulging (assuming there's nothing else in it). But the files haven't been deleted from that floppy, and if you reinsert it, the Trash will bulge again.

To empty the Trash when it contains a locked file, hold down Option while choosing the *Empty Trash* command. If a file is in use, you have to close it before you can delete it (in some cases, you have to close its application too).

Under System 6, the Trash is automatically emptied when you restart or shut down your Mac, launch a program,

copy or duplicate a file on a disk from which you've trashed a file, or eject the disk a trashed file came from.

turning off the Trash warning (CR)

Normally, when you try to empty the Trash, you're asked if you're sure you want to do that; if you find this tiresome, you'll be happy to know that you can disable this dialog box. To do that, select the Trash icon, hit ⌘I and uncheck the *Warn before emptying* checkbox in the Get Info window that appears. If you like the warning in most circumstances but want to avoid it temporarily, just hold down the Option key when you empty the Trash.

In System 6, you get warnings when you drag applications or system software files to the Trash and if you try to empty the Trash when it contains these items. To disable these warnings, hold down the Option key when you drag the items to the Trash or when you empty it.

the Trash and Desktop folders (CR)

The Mac creates folders called *Trash* and *Desktop Folder* to store Trash contents or items placed directly on the desktop. They're normally invisible to the user, but you may see them on a disk you're sharing with someone else, or you may discover them while using a utility program like DiskTop. If you do see them, just leave them alone.

finding Finder shortcuts (JK)

There are a lot of very handy shortcuts in the Finder, and System 7 makes it easy to keep track of them. For a list, select *Finder Shortcuts* from the Help menu in the Finder.

preserving and restoring Clipboard contents (SA)

To delete something without affecting the contents of the Clipboard, use the Delete key instead of ⌘X.

If you cut or copy something and then realize you still need what was previously on the Clipboard, choose *Undo*

(or hit ⌘Z). When it undoes the cut or copy, it also restores the Clipboard to its previous state.

special Clipboard contents *(SA)*

Some applications put special information on the Clipboard when you cut or copy. If you paste within that same application, the special information is also pasted; if you paste outside the application, the special information is lost.

For example, if you copy a paragraph in Word, the invisible paragraph marker, which contains formatting information, is also copied to the Clipboard. Pasted into another Word document (or the same one, in a different place), the paragraph retains its original formatting information. Pasted into an application that doesn't know how to interpret the special information, you'll only get the text of the original paragraph, and maybe some of its basic formatting, like tabs and indents.

To copy something from a PostScript program like Illustrator or FreeHand and paste it into a program that can't directly import PostScript material, hold down Option while you choose *Copy* from the Edit menu.

losing Clipboard contents *(SA/CR)*

Sometimes the Clipboard comes up empty in an application, even though you just cut or copied something into it in another application. But when you go back to the first application, you find the Clipboard contents intact. If that happens, just paste via the Scrapbook instead.

Save large Clipboard? *(SA/AN)*

Sometimes when you quit an application, you'll get a dialog box that asks *Save large Clipboard?* This means you have a lot of material in the Clipboard, and the application wonders if you'll have a use for it once you've quit. So you're given a chance to flush the Clipboard of its contents, or to save them.

escaping switch-disks nightmares *(Michael Bradley/SA/AN)*

To escape from one of those interminable switch-disks nightmares (the kind that make you want to scream at your Mac, *You want that disk again? There's something sick about your obsession with that disk!)*, press ⌘. Sometimes you have to press it more than once and sometimes it won't work at all, but it's worth trying.

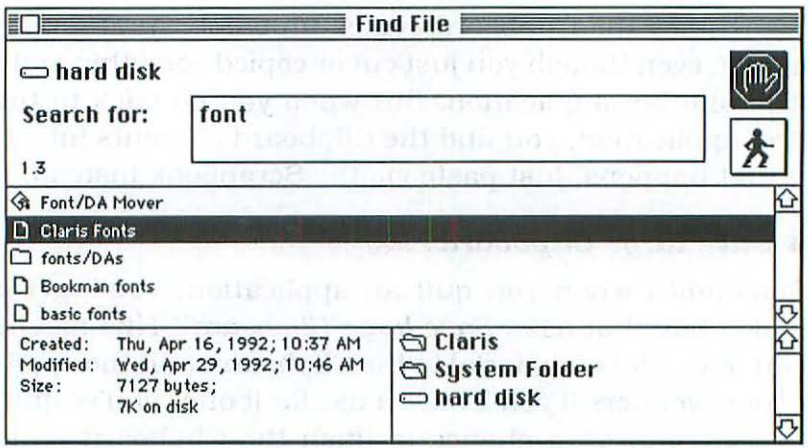
why Shut Down is important *(SA/AN)*

Using the *Shut Down* command from the Special menu, instead of just shutting off the power, gives the Mac a chance to save any open files to disk. If you turn your Mac off without Shutting Down, you'll lose whatever is in memory.

System 6 tips

using Find File *(JK)*

Find File is a DA that comes with System 6. When you select it from the menu, you get a dialog box like the one shown below:

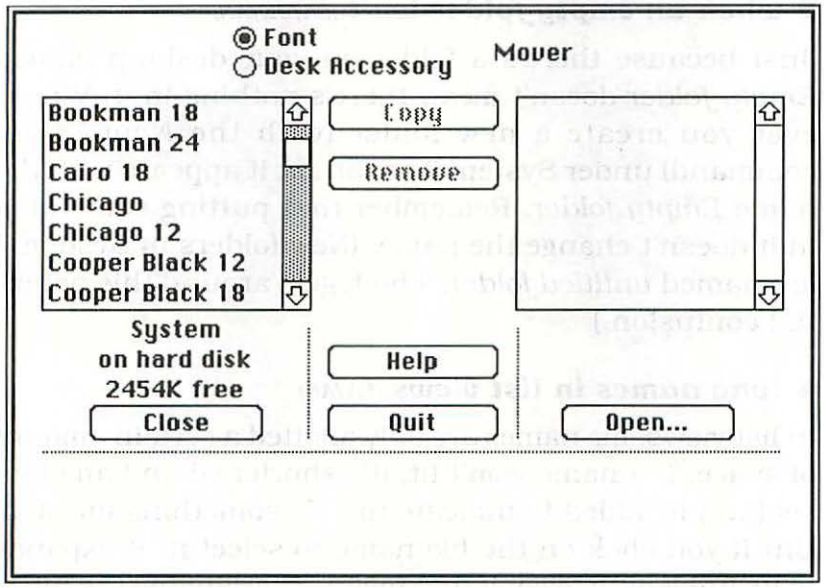


To search for a file or folder, type any part of its name in the text box. The Mac will list everything it finds whose name includes what you typed. When you select a particular item from the list, Find File shows the path to its location in the lower right-hand corner of the dialog box.

Once you've found what you were looking for, you don't have to dig it out of whatever folder it's in—just choose *Move to Desktop* from the Find File menu on the menu bar. When you're through using the item, select it and choose *Put Away* from the File menu, and it'll return to the folder it came out of.

using Font/DA Mover *(JK)*

Font/DA Mover is a utility for moving or removing fonts and DA's between or from suitcase files and the System file. When you run the program, you get a dialog box like this:



Select *Font* or *Desk Accessory* from the top of the box, depending on what you want to move. The program automatically opens the System file in the left-hand list box,

but if you're not moving anything into or out of it, click the *Close* button below the box and then click it again to open whatever file you do want to use (the button's name changes to *Open* after the first click).

If you're moving items between files, click the button under the right-hand list box to open the other file (or to create a new one). Once it's open, select the items you want to move (you can shift-click or drag through them to select more than one), click the *Copy* button and they'll be copied to the file shown in the other box.

If you're removing items from a file, just select them and then click the *Remove* button.

There are several third-party programs that make it easier to load and unload fonts and DA's from your System. See Chapter 7 for more about them.

when an empty folder isn't *(SA/JK/AN)*

Just because there's a folder on your desktop named *Empty folder* doesn't mean there's nothing in it. Whenever you create a new folder (with the *New Folder* command) under System 6 or earlier, it appears with the name *Empty folder*. Remember that putting something in it doesn't change the name. (New folders in System 7 are named *untitled folder*, which gets around this potential confusion.)

long names in list views *(SA/AN)*

In list views, file names are only allotted a certain amount of space. If a name won't fit, it's shortened and an ellipsis (...) is added to indicate there's something missing. But if you click on the file name to select it, it expands to its full length, even if that means overlapping the information in the next column. Unfortunately, this does *not* work in System 7.

switching to MultiFinder *(SA)*

If you're running in Finder-only mode, you don't have to set the startup and restart the Mac to go into MultiFinder; instead, simply open the System Folder, hold down Option ⌘ and double-click on the MultiFinder icon.

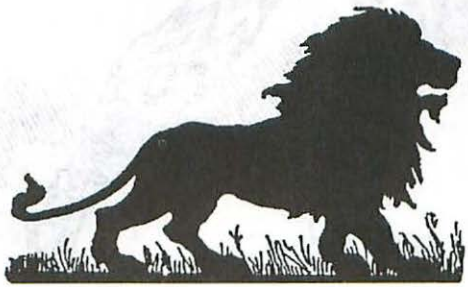
if DA's disappear in MultiFinder *(SA)*

If you just started using MultiFinder and find that there's little or nothing under your menu—or that you can't open anything that appears in the menu (all you get is a beep)—you need to put the *DA Handler* file into your System Folder. It's on the System Tools disk; just copy it over and restart your system.

memory fragmentation in MultiFinder *(SA/AN)*

The first program you launch under MultiFinder gets the first chunk of available RAM, the second gets the next chunk, and so on. When you quit a program, the RAM it used doesn't get thrown back into the pool of available RAM—instead, it leaves a hole of empty memory between the program launched before it and the one launched after it. (Only if it was the *last* program you launched does the memory go back into the pool.)

To get around this limitation, first launch the program you use the most, and are therefore least likely to quit. Then launch the program you use the next most, and so on.



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Chapter 5

Printing

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Printer basics

types of printers (AN/JK/Barnard Sherman)

Three types of printers are commonly used with Macs—*dot-matrix, inkjet* and *laser.* You can also output from a Mac directly to an *imagesetter.*

Dot-matrix printers (like Apple's ImageWriters) form characters out of a pattern of dots, the way the Mac forms images on the screen. Typically, each dot is made by a pin pushing an inked ribbon against the paper (although there are other ways of producing the image). The number of pins can vary, with 9-pin and 24-pin being two common configurations; the more pins, the better the print quality. The main advantage of dot-matrix printers is that the impact of the pins lets you make multiple copies using carbon or NCR paper.

Like dot-matrix printers, *inkjet* printers form characters out of little dots, but because the dots are created by tiny jets of ink, they're more like splotches, and blend together much more than the dots produced by dot-matrix printers. Inkjets are also much quieter and somewhat faster than dot-matrix printers, and produce higher quality output. Apple's StyleWriter and Hewlett-Packard's DeskWriter are two inkjet printers that are compatible with the Mac.

Laser printers (like Apple's LaserWriters) create images by drawing them on a metal drum with a beam of laser light. The image is then made visible by electrostatically attracting dry ink powder (called *toner)* to it, as in a photocopying machine. The toner is then bonded *(fused)* to the paper by heat and pressure. Laser printers are more expensive than dot-matrix or inkjet printers, but their output is generally superior.

Imagesetters are digital typesetting machines; unlike traditional typesetters, they can produce graphics as well

as text. These high-end machines output onto film or the kind of photosensitive paper used for photostats.

relative resolutions *(AN/JK/Larry Pina)*

At best quality, text is printed out on Apple's ImageWriter dot-matrix printer at 160 dots per inch *(dpi)* across and 144 down, which gives you about 23,000 dots per square inch *(dpsi)*. If you choose *Tall Adjusted* for nontext printing, you get 144 dpi in both directions, which gives you almost 21,000 dpsi.

HP's DeskWriter inkjet printer produces 300 x 300 dots per inch, which gives you 90,000 dots per square inch—about four times the ImageWriter's resolution—and Apple's StyleWriter inkjet produces 360 x 360 dpi, which gives you almost 130,000 dpsi—about six times the ImageWriter's resolution. Most other inkjet printers are in this range.

Most laser printers (including all the LaserWriters) produce 300 x 300 dots per inch, but some give you 400 x 400, 600 x 600, 800 x 300, 1000 x 400, 1200 x 600 and so on. The dots per square inch range from 90,000 to 720,000—which means that at the high end, they provide more than five times the resolution of the best inkjets. Some laser printers (including some LaserWriters) also offer various forms of *enhanced resolution*, which smooths jagged edges and/or sharpens grayscales to give the appearance of higher-dpi output.

Even 720,000 dpsi is nothing compared to what an imagesetter can do. For example, the 1270-dpi Linotronic 100 produces 1.6 million dpsi—nearly 18 times the resolution of a LaserWriter and almost 70 times that of an ImageWriter. The 3386-dpi Linotronic 330 produces about 11.5 million dpsi—more than 125 times the LaserWriter's resolution and almost 500 times the ImageWriter's.

PostScript vs. non-PostScript (RS/AN/JK)

mostly for beginners

There are two basic kinds of laser printers—those that have PostScript (Adobe's page-description programming language) built into their ROM and those that don't (no inkjet or dot-matrix printer uses PostScript). PostScript printers can be shared by Macs on a network, give you access to outline fonts and let you print PostScript graphics like those produced by Illustrator and FreeHand. (For more on outline fonts, and other font terms used in this chapter, see Chapter 6.)

But some non-PostScript printers, like HP's DeskWriter, can also be shared by Macs on a network, and many printers can generate text that's at or near the quality of what PostScript laser printers produce, as long as the printer has high enough resolution and you use TrueType fonts or PostScript Type 1 fonts with Adobe Type Manager (ATM). In the absence of TrueType fonts or ATM, most non-PostScript printers rely on QuickDraw, the Mac's built-in imaging software, to scale bit-mapped fonts like those used on the Mac's screen.

important warning

You can also print PostScript graphics on a non-PostScript printer, by using an interpreter program like T-Script Basic or Freedom of Press (both list for $500), but they tend to *really* slow down printing. A complex graphic might take as long as 45 minutes to print from a slow Mac like the Plus, SE or Classic. And interpreters sometimes screw up and misplace lines or cause other problems.

very hot tip

In any case, the price of a non-PostScript laser printer and an interpreter often adds up to more than the price of a good, inexpensive PostScript printer. Using an interpreter with an inkjet printer might make more sense economically, but don't expect professional-quality graphics from an inkjet. Among other problems, they print large black areas poorly—the page gets wet with ink and the paper wrinkles.

For professional desktop publishing and graphics work, there's no substitute for a PostScript laser printer. But if you mainly print text and bit-mapped graphics, a less expensive printer will probably give you everything you need.

As mentioned above, there are also PostScript imagesetters, made by Linotronic, Varityper and other companies, that print at high resolution on film or photosensitive paper. They're not consumer items, though, with list prices starting around $35,000.

✎ *adapting PC printers for the Mac* *(Larry Pina/RS)*

Some printers are built to work with Macs, some to work with PCs. But you can still use a PC printer with a Mac; you just need a Macintosh driver and a serial-to-parallel converter cable. Packages offering both are easy to find.

Larry's favorite is PowerPrint from GDT SoftWorks ($150 list). It includes a serial-to-parallel converter, two disks and a great manual. One disk contains a set of drivers that lets you connect to *hundreds* of dot-matrix printers, including those made by Okidata, NEC, Epson, Citizen and Panasonic. The other disk has drivers for hundreds of inkjet and laser printers, including those made by Canon, Dataproducts, Hewlett-Packard and Sharp.

PC laser printers aren't generally designed to use PostScript, but you can add an AppleTalk interface and a PostScript board or cartridge to some of them (check with the manufacturer). Even without these upgrades, PowerPrint lets you use TrueType fonts, and you can print PostScript fonts if you've got ATM.

Conversion kits like PowerPrint give you access to more printers (and sometimes better ones, as described below) but there are tradeoffs. Using a PC printer sometimes leads to unexpected printing problems and the conversion package can slow down a printer's output. The conversion also makes the printer more complicated to set up, and you'll

only get limited help from a printer manual written for PC users.

Dot-matrix printers

models of the ImageWriter *(AN/SA/Larry Pina/JK)*

mostly for beginners

The first model of the ImageWriter (now called *the ImageWriter I)* was replaced years ago by the ImageWriter II, but since there are still some I's kicking around, here's how to tell the two models apart: the I is beige and rectangular while the II is either white (early models) or light gray—what Apple calls "platinum"—with a raised back.

The ImageWriter II has fewer problems with paper feed than the I, and it also prints more clearly (the same number of dots are used, but since the II's pins are smaller, so are the dots they create). The II prints faster than the I and has a slot for a $140 card that lets you use it on a network (i.e., hooked up to more than one Mac). You can also install a $14 color ribbon. When we refer to the ImageWriter below, we mean the ImageWriter II, unless we specifically say otherwise.

Apple also used to make a 27-pin version of the ImageWriter called the LQ, for "letter-quality" (the ImageWriter I and II are 9-pin printers). The LQ had a lot of problems and has been discontinued. For better alternatives, see the sections on inkjet and laser printers below.

ImageWriter substitutes *(RS/Larry Pina/JK)*

The ImageWriter is hardly a bargain, even if you buy one used. Not only is its $600 list price high for its capabilities, but discounts on it are usually a lot shallower than on third-party competitors, which often sell for 40–50% off. Here are a couple of better alternatives (also see the section below on inkjet printers).

If your budget is tight and your printing needs are modest, consider the Olympia NP60APL ($180, available only direct through Olympia). As far as the Mac is concerned, having it at the end of the cable is just like having an ImageWriter I there (even its performance is similar). The only exception is that it handles margins differently (the manual explains how to make the necessary adjustments). The Olympia is a bit slower than the ImageWriter II—190 characters per second *(cps)* in draft mode, 40 cps in near-letter quality, compared to the ImageWriter II's 250 cps and 45 cps).

Because the Olympia works just as well connected to a PC as to a Mac, it's an excellent choice for office environments with mixed equipment. Parallel and serial ports are standard; so are a push-type tractor feed and semi-automatic sheet feeding. A pull-type tractor feed ($90) and a true sheet feeder ($170) are available as options. It uses inexpensive Epson LX80 ribbons that you can get anywhere, even at stationery stores.

The Panasonic KXP-1123 ($350 list) isn't actually an ImageWriter substitute—it wasn't even designed for use with Macs. But at nearly twice the price of the Olympia, it's still cheaper than the ImageWriter II, even after you add $150 for the PowerPrint package you'll need to use it with the Mac (described in *adapting PC printers for the Mac* entry above). And since it's a 24-pin, 360-dpi printer, it gives much higher quality output. It's also sturdy, well-supported, easy-to-find and often deeply discounted.

Setting up the Panasonic can be a bit of a pain because of the unusual combination of buttons on its front (remember, it comes from the world of PCs). But once it's set up, the Panasonic works well, particularly at intermediate resolution (180 x 360 dpi), which looks nearly as good as the 360 x 360 dpi high-quality mode but prints faster. Even graphics look pretty good (but don't get this printer—or any dot-matrix—for printing graphics).

an envelope printer *(KF/JK)*

The AddressWriter ($600, from CoStar) is an 8-pin printer designed specifically for printing addresses directly onto envelopes or postcards (or, with an optional $75 attachment, labels). It's compatible with Macs and PCs and can be upgraded for sharing on a Mac network for $200.

The printer comes with an application that can handle up to 1600 addresses and can exchange them with other programs. You can also print directly from a word processor or database, and the addresses can even include PICT graphics.

The AddressWriter's best feature is its ability to generate and print a postal bar code for each address. The bar code not only speeds up delivery of your mail, it can save you up to 20% on bulk mailings.

With the bar code option on, the AddressWriter prints 2–3 envelopes a minute in Normal mode and 1–2 per minute in Best mode (in either case, the first envelope printed takes longer than the rest). The automatic feeder holds up to 100 envelopes or 200 postcards.

In Karen's tests, some envelopes came out slightly smeared; the manual says this happens with defective ribbons, but we couldn't get another ribbon in time to check this out. Ribbons cost $15 and are good for about a thousand envelopes.

Even at discounted retail prices, this printer is quite an investment for such a specialized function. But for offices that routinely process a lot of outgoing mail, it can save the extra time required to print and apply address labels manually, or feed envelopes through the printer one by one, as you'd have to do with other printers.

[I agree that this is a really cool product but, boy, is it overpriced! Keep in mind how incredibly easy it is to print envelopes on a laser or inkjet printer, whose output is

much better. Bar codes can be printed with many other inexpensive software packages. The AddressWriter's only real advantage is that it has an envelope feeder.—RS]

a label printer *(Sheila Sugrue)*

The Smart Label Printer Plus ($250, from Seiko) is a tiny printer (6" x 6" x 3½") that prints addresses onto 3½" x 1" labels. You just type an address into the DA that comes with the printer, and print it out in the font and size of your choice. The DA will store as many addresses as will fit on your disk, and will import them from other programs.

The SLP is designed for printing *individual* labels; for large mailings, look elsewhere. It can only use the 3½" x 1" labels, which you have to order from Seiko at $4 for a roll of 130 (about 3¢ each). But overall, I'd say the SLP is worth it, for the convenience of being able to easily print a customized label any time you want.

[But you can't do bar codes with this printer, since they have to appear at both the top and bottom of the envelope to be read properly by the post office. And labels can be easily printed on a StyleWriter, which is not much more expensive than this gadget is and is way more versatile. You also have to peel off each label and stick it onto the envelopes—almost as much work as just feeding individual envelopes into a StyleWriter.—RS]

Inkjet and portable printers

DeskWriter vs. StyleWriter

(JK/Chris Allen/Larry Pina/Barnard Sherman)

Hewlett-Packard's DeskWriter ($600 list) and Apple's StyleWriter ($400 list) have replaced dot-matrix printers as the most popular printers for personal and light business use. They're much quieter, sell for less than

an ImageWriter II and (at 300 dpi for the DeskWriter and 360 dpi for the StyleWriter) produce output that rivals a laser printer's.

In fact, some people prefer the inkjets' output, because the blacks are blacker—although it's also less crisp, because the ink tends to bleed into the paper (for more on this, see *paper for crisper print quality* in the *inkjet tips* section below). Although the StyleWriter's resolution is higher, the output from both inkjets looks about the same.

Since these aren't PostScript printers, neither can print PostScript text or graphics. For ways around this, see the entry called *PostScript vs. non-PostScript* above. The DeskWriter comes with Helvetica, Courier, Times and Symbol in HP's own outline format (additional fonts cost $200) and the StyleWriter comes with TrueType versions of those four and several others. If you use System 7, though, you already have most of these as TrueType fonts, and you can use them with either printer.

Both printers can use spoolers to let you keep working while your files print in the background. (If you have an older nonspooling version of either printer's driver, see your dealer about getting a free update.)

The DeskWriter has several advantages over the StyleWriter. It prints up to twice as fast, at two or more pages per minute and, unlike the StyleWriter, it can be shared by Macs on a network. It comes with a three-year warranty, while Apple only covers the StyleWriter for a year (an extended warranty costs $36 a year).

The StyleWriter's ink is water-soluble, so smearing can be a problem if you don't handle printouts carefully. The DeskWriter's ink is relatively indelible and smear-proof, though it sometimes clogs the printhead. You can buy third-party indelible inks for the StyleWriter, but they're not as good as the DeskWriter's.

The StyleWriter's vertical sheet feeder is more prone to misfeeding than the DeskWriter's. And you can upgrade the DeskWriter to print in color.

The StyleWriter does take up much less desk space (about 13" x 6"), but it gets a few inches wider when you open its output tray (as you have to during printing). Although the DeskWriter measures 17½" x 15", it has a recessed well for cables in the back, so you can slide it all the way up against a wall.

You can probably get a StyleWriter for about $50 less than a DeskWriter (at street prices) but the DeskWriter is worth way more than $50 more; it's a much better printer.

the color DeskWriter *(JK)*

Hewlett-Packard's DeskWriter C is designed to print primarily in black, and it produces the same crisp, clean 300-dpi output as the regular DeskWriter (described in the previous entry). But the C can also print in color (or gray-scale).

Color printing takes longer—four minutes a page for Normal mode and seven for Best mode (which gives a better color mix by overlapping dots in a shingle pattern). Draft mode produces a page in about three minutes, but at only 150 dpi. By comparison, the C puts out about two black or one gray-scale page a minute. (These are HP's official speed ratings; the actual times vary widely depending on what's being printed.) Luckily, the DeskWriter C comes with a spooler, so you can use your Mac for other work while your documents print in the background.

To print in color, all you have to do is replace the black ink cartridge with one that contains cyan, magenta and yellow (switching takes about 20 seconds). There are some disadvantages to having to choose between black and color. For example, if your document contains black text and a color graphic on the same page, you have to

use the color cartridge. The printer then mixes cyan, magenta and yellow to make a slightly grayish or brownish "black" for the text. And the missing black will also reduce the crispness of the color graphic (that's why full-color images are normally printed in *four*-color process—cyan, magenta, yellow *and* black).

The DeskWriter C provides fast, high-resolution text and color graphics for $1100 list (HP will upgrade a regular DeskWriter for $450). For better color, resolution and speed at a higher price, see the next entry.

✎ *a high-resolution, full-color inkjet* (RS)

If you've ever shopped for a color printer, you know that usually the prices are stratospheric or the color output is poor. The Canon BJC-820 is an exception—it's a four-color, 360-dpi inkjet printer that lists for $3000, and its color and resolution are excellent. Since color laser printers cost $6000–$12,000 and more, this is an amazing deal.

The Canon's speed depends mainly on how fast your Mac is (since there's so much computation involved in color images). One drawback: the Canon isn't a PostScript printer, so if you want to print to it from a PostScript program, you'll have ask the publisher how to do it.

✎ *four good portable printers* (RS/JK)

None of the portable printers available for the Mac are as good as some that are made for PCs. Luckily, you can adapt the PC printers for $150 with GDT's PowerPrint package (described in the entry above called *adapting PC printers for the Mac).* Here are four PC printers that are light and small enough to carry in a briefcase and can run off batteries (although you'll only get about 30 pages per charge).

The Canon BubbleJet BJ10ex, the Star Micronics Star-Jet SJ-48 and the Brother HJ-100i are essentially the same inkjet printer sold under different names. They weigh

less than five pounds, fold up into notebook size (about 12" x 8½" x 2"), use plain paper and are unusually quiet (about 45 dB).

They've got the same 360-dpi resolution as Apple's StyleWriter and print bit-mapped graphics well (except for large black areas where, like all inkjets, they lay down so much ink that the paper gets wet and wrinkles). All three list for $500 and commonly sell for a lot less (add $50 if you want the optional rechargeable battery).

The Citizen PN48 Professional uses *thermal fusion*, a technology in which tiny heated elements in the printhead push a ribbon against the page, bonding a waxy ink to the paper. (It's not an impact printer, though; the pressure is more smooth and continuous, and the printing is much quieter.)

The Citizen's output doesn't spread on the page like the inkjets' and its 360 dpi gives you laser-like crispness (if you use the higher-quality ribbon). The Citizen can print on transparencies and plain paper, but you'll get the best results using high-quality laser paper. It prints bit-mapped graphics well, without the inkjets' problem with soaked paper.

The Citizen costs a bit more than the inkjets ($550 list) but the price includes a battery. It's much lighter and smaller—only 2½ pounds *including* the battery, and about 12" x 3½" x 2" (about the size of two rolls of tin foil).

Printing complex graphics on the Citizen makes its $5 ribbon wear out quickly. Even when it's just printing text, the ribbon wears out after about 30 pages. The inkjets have an advantage here—they print around a thousand pages per $25 cartridge.

None of these printers come with Macintosh outline fonts, but you can use any TrueType fonts you already have—or PostScript fonts with ATM. Unfortunately, printing

is very slow—an average of just over two minutes per page using outline fonts and medium resolution (partly due to the PowerPrint conversion).

Since the price differences between these printers aren't significant, choose the inkjets if you want quieter operation and cheaper consumables, or the Citizen if you want superior print quality and smaller size and weight.

two not-so-good portable printers *(AN/JK)*

There are a couple of other portable printers for the Mac—GCC's $500 WriteMove and Kodak's $450 Diconix M150. They're both inkjets, but their 192-dpi output looks crude next to that of the printers discussed in the previous entry.

Actually, the Diconix is a lot worse than "not-so-good"—it's worthless. We've used it at Goldstein & Blair and found its tractor feed to be so poorly designed that it simply wouldn't feed paper. (Friction feed—that is, running regular, unperforated sheets of paper through the printer—was even worse.)

Did we call the Diconix "worthless?" Actually, that's way too kind. Given the amount of time we wasted trying to make the stupid thing work, and standing around wondering how someone can sell a product that simply doesn't work at all—not to mention the amount of effort we wasted lugging it around on vacations and business trips, only to discover that it was unusable and that we didn't have a printer to use after all—we'd have to say the Diconix is *worse* than worthless.

We sent it back to Kodak and they promised to send us a printer that could at least feed paper, but we never got one. They don't even respond to our phone calls. This may be the single worst Mac product we've ever seen. *[Don't mince words. What do you really think of the product?—RS]*

Laser printers

the LaserWriter I's *(AN/SA/JK)*

The first laser printers Apple sold were the Laserwriter (no cap *W*) and the LaserWriter Plus. (There were actually two models of the LaserWriter Plus—the second came with version 47 of PostScript—but they weren't given separate names.) All three models are now lumped together as the *LaserWriter I.*

All three machines look alike, but you can tell them apart by printing out a startup sheet. There will be a number on the line graph: 1.0 indicates an original Laserwriter, 2.0 the first version of the LaserWriter Plus and 3.0 the second version of the LaserWriter Plus.

The original Laserwriter came with four fonts built in—Helvetica, Times, Courier and Symbol. The LaserWriter Plus added Avant Garde, Bookman, Helvetica Narrow, New Century Schoolbook, Palatino, Zapf Chancery and Zapf Dingbats.

LaserWriter I's were built around Canon's CX *marking engine* (the part of the printer that actually makes the image). The CX works fine for most things but its top speed is only four pages a minute and it can't produce a solid black area (it ends up gray or streaked). In addition, LaserWriter I's were hamstrung by having just 1.5 megabytes of RAM, which greatly (and very annoyingly) limited the number of fonts you could use in a document.

the printer with five brains *(AN/JK/Barnard Sherman)*

We could have called this entry *the LaserWriter II's*, but then we wouldn't have been able to allude to *The Man with Two Brains*, a wonderful Steve Martin movie which is worth seeing just to hear Kathleen Turner hiss at her rich husband (who she's trying to give a heart attack so that she can inherit his money): "You just hate me

because I'm so young and hot!" But there is actually a point to this title—namely that all LaserWriter II's are physically identical except that each has a different brain (logic board).

In 1988, Apple introduced three LaserWriter II's—the NT, NTX and SC (all discontinued, but still available used). The IIf and IIg came out in 1991. All five models are built around Canon's second-generation marking engine, the SX, which produces much solider and darker blacks than the CX marking engine that was used in the LaserWriter I's (in fact, sometimes the blacks are too dark).

All LaserWriter II's have paper trays that will hold 200 sheets of 20-lb paper. And all except the SC come with the same basic eleven built-in font families as the LaserWriter Plus (listed in the previous entry).

The SC was so called because it connected to the Mac through the SCSI port, like a hard disk. For this reason, it could only be accessed by one Mac (all the other LaserWriter II's can be shared by several Macs). The SC's logic board was built around a 68000 chip and it had just one meg of RAM (but since it relied on the Mac to figure out how pages should look, this wasn't much of a disadvantage).

The logic board on the NT (for *new technology)* was also built around a 68000 chip, but it ran at 12 MHz (as opposed to the SC's 7.45 MHz). Both the NT and the NTX (the *x* stands for *expandable)* came with two megs of RAM standard, but you can expand it up to twelve megs just by popping in some SIMMs (be aware that NTX SIMMs are different—and more expensive—than regular Mac SIMMs). The NTX's logic board is based on a 68020 chip running at 16.7 MHz.

The NTX can be connected to a SCSI hard disk for storing fonts, which speeds printing by getting outline fonts to the printer much faster than downloading them from the Mac does (for more on this, see the *fonts on laser*

printers section below). Make sure you get a hard drive that works with LaserWriters; not all do. Also make sure it's initialized properly for working with the printer rather than a computer.

The logic boards for the LaserWriter IIf ($3600 list) and IIg ($4600 list) are both built around the 68030 chip; the IIf's runs at 20 MHz and the IIg's at 25 MHz.

The IIf comes with four megs of RAM standard and the IIg with eight, but be aware that, amazingly, both machines need five megs to print on legal-size paper, so the IIf has to be upgraded to do that basic task (you can expand both machines' RAM to 32 megs). On the plus side, the IIf and IIg use the same kind of RAM most Macs do, which is much cheaper than the special RAM you have to buy to upgrade an NTX.

The IIg and IIf are the first Apple laser printers to use Apple's enhanced resolution technologies, FinePrint and PhotoGrade (although you have to upgrade the IIf's memory to 5MB to use PhotoGrade). FinePrint smooths out the barely perceptible jagged edges in 300-dpi printing (although it also tends to break up delicate fonts like Optima at small sizes—so much so that we finally had to turn it off on our machines). PhotoGrade lets you print with more than 65 levels of gray, which *greatly* improves the quality of gray-scale images like scanned photographs—nothing in the IIf or IIg's price range comes close.

Like the NTX, the IIf and IIg can be connected to a SCSI hard disk for storing downloadable fonts. But disks need to be formatted differently, so you can't just move a hard disk from, say, an NTX to a IIg—you'll have to reformat it and download all your fonts. *[I did it—it's such a pain. After much experience with hard disks attached to LaserWriters, I've pretty much decided that they're simply not worth the trouble—thanks to their brain-dead user interface.—AN]*

All LaserWriter I and II models to date print eight pages a minute, not counting the time they and/or your Mac spend figuring out what to put on the page. (To speed that up, you need a faster chip and more memory in either your Mac or your printer, or both.)

Another way to speed things up is with PostScript Level 2, which comes in both the IIf and the IIg. It promises to increase page-processing speed up to ten times, though the printer driver required to do that isn't available at this writing.

Here's a chart summarizing the features of the five LaserWriter II's:

Laser-Writer	Post-Script?	pro-cessor	speed (MHz)	inter-face(s)	RAM (MB)	can take hard disk?
IISC	no	68000	7.5	SCSI	1	no
IINT	yes	68000	12	LT serial	2	no
IINTX	yes	68020	16	LT serial	2 (12)	yes
IIf	**Level 2**	**68030**	**20**	**LT serial**	**4 (32)**	**yes**
IIg	**Level 2**	**68030**	**25**	**LT serial Ethernet**	**8 (32)**	**yes**

Notes: Current models (as of this writing) are in bold.

Interface(s) indicate the ways you can connect the printer to a Mac. LT = LocalTalk, the standard interface. The serial interface is mostly for connecting to PCs. Ethernet is blindingly fast.

The first number in the RAM column indicates how much the printer comes with; the number in parentheses (if any) indicates how much RAM you can expand it to.

You can upgrade any lower model of the Laser Writer II—current or discontinued—to any higher one, simply by

buying it a new brain. For example, you can upgrade a IISC to a IIg for $2250, an NT to a IIg for $2150 and an NTX to a IIg for $2050.

The fact that Apple consistently provides upgrades like this adds to their printers' value as long-term investments (this is true of the Personal LaserWriters, described below, as well). Few other companies' printers are as easy to upgrade, or upgradable at all (although Texas Instruments' are).

✎ *the Personal LaserWriters* *(JK/Larry Pina)*

Apple introduced the Personal LaserWriters to make laser printing more affordable—they cost thousands less than the LaserWriter II's. All are built around the Canon LX marking engine, which has a top speed of four pages a minute, and all but the NTR use the 68000 processor.

One of the first Personal LaserWriters was the SC, so called because, like the LaserWriter IISC, it connects to the Mac via the SCSI port. It was replaced within months by the Personal LaserWriter LS, which, at $1200 list, remains Apple's least-expensive laser printer. It connects to the Mac through the printer port, but can't be shared by Macs on a network. It's not a PostScript printer either, so you'll need ATM to print PostScript outline fonts. You can still use TrueType fonts, though, under System 7.

The SC came with a 250-sheet paper tray and a 50-sheet multipurpose tray for printing on odd-sized paper, envelopes or labels, but the LS comes with only the 50-sheet multipurpose tray; the 250-sheet paper tray is an $80 option.

With just 512K of RAM (not expandable) the LS is particularly sluggish on complex printing jobs (although it uses a special data compression technology to create the effect of 2.5 megs of RAM in some situations). Apple has improved upon the LS's original driver, however, and more recent versions are supposed to be faster. If you're

using an old version of the driver, get a current one from an Apple dealer or by calling Apple at 800 776 2333.

The second of the original two Personal LaserWriters was the NT, a PostScript printer that can be shared by Macs on a network. It came with a 12 MHz processor, two megs of memory (expandable to four megs) and the same paper and multipurpose trays as the SC. It lasted a year longer than the SC, but was eventually replaced by the NTR.

The Personal LaserWriter NTR comes with three megs of RAM and generally prints much faster than its predecessor, the NT (over twice as fast, in some situations). Yet it costs the same ($2200 list).

The NTR gets its speed—and the *R* in its name—from the RISC chip it uses to process jobs (*RISC* stands for reduced instruction set computing; it streamlines processing for faster results). The NTR is the first Apple printer to use RISC technology.

It's also the first LaserWriter to offer a parallel port for connecting to PCs, in addition to the serial and LocalTalk ports other LaserWriters have. If you're in an office with PCs and Macs, you can attach both types of computers to the NTR and it will configure itself for each print job according to whether you've assigned PostScript or HP format to the port the job's coming in on. (There's a switch on the printer's back panel for assigning formats.)

Like the LaserWriter IIf and IIg, the NTR comes with PostScript Level 2 and a built-in TrueType scaler. (With most printers, the Mac has to download the scaler in order to print TrueType fonts; but since it's already on the NTR's board, there's less to download, and TrueType jobs print faster.)

Although the NTR is nearly as fast as the IIg when printing documents containing complex graphics and multiple fonts, the IIg races ahead when printing documents

with a single PostScript font. (In that situation, the NTR's no faster than the Personal LaserWriter NT. They're both limited to four pages a minute by their Canon LX marking engine, while the IIg's Canon SX marking engine can deliver eight pages a minute.)

And the NTR isn't built for heavy use. Whereas LaserWriters II's come with a 200-sheet paper tray and a manual feeder for envelopes, etc., the NTR has only a 70-sheet multipurpose tray (although you can upgrade it to take a 250-sheet tray for $180).

Still, if you want speed, and don't tend to print long documents in a single font, the NTR is probably the best choice in its price range—as of this writing anyway. (If you do tend to print long documents in a single font, read on in this section for some more economical alternatives.)

Here's a summary of the Personal LaserWriter models:

Personal LW	PostScript?	processor	speed (MHz)	interface	RAM (MB)	tray capacities
SC	no	68000	8	SCSI	1	250 + 50
LS	**no**	**none**	**—**	**serial**	**½**	**50 (250)**
NT	yes	68000	12	LT	2 (4)	250 + 50
NTR	**Level 2**	**AM29005 (RISC)**	**16**	**LT serial parallel**	**3 (4)**	**70 (250)**

Notes: Current models (as of this writing) are in bold.

Interface(s) indicate the ways you can connect the printer to a Mac. LT = LocalTalk. On the NTR, the serial and parallel interfaces are mostly for connecting to PCs.

The first number in the RAM column indicates how much the printer comes with; the number in parentheses (if any) indicates much RAM you can expand it to.

In the tray capacity column, optional trays (which cost extra) are in parentheses.

✎ telling LaserWriters apart *(AN/Larry Pina)*

It's easy to tell LaserWriter I's, II's and Personal LaserWriters apart, because they look different. There are a couple of ways to distinguish the various models within each line. One is to look at the label on the logic board at the bottom rear of the machine (on LaserWriter I's, it's on the metal plate where the cables connect to the printer). Another is to print out the startup sheet.

✎ buying a used LaserWriter *(Chris Allen/Barnard Sherman)*

One of the first things you do when buying a used car is check the odometer. So one of the first things you should do when buying a used LaserWriter is check out the startup page to see how many copies it's printed. Chris has a friend who found a used LaserWriter with only 6000 pages on it; another one she looked at had over 90,000!

[Rely on this approach only when you're buying from a trustworthy party, because the counters are easy to turn back. Be wary of most dealers.—Larry Pina]

With LaserWriter I's, just turning on the machine causes wear on the fuser roller, even if you don't print any pages. To check it, open the printer and lift up the green bar that's near the front. If scratches go all the way through the roller's reddish-brown coating, you'll need a new one. If it's only slightly scratched, check the printer's output—a worn roller prints blank or streaked spots even when you have enough toner.

✎ a good cheap PostScript printer *(RS)*

For its price, Texas Instruments' MicroLaser PS17 ($1500 list) has a lot of nice features, including true Adobe PostScript (not a clone) and HP LaserJet compatibility (so it can be shared by Macs and PCs in offices that have both). With a footprint of 14" x 13½" it can even fit on your desk and leave room to work.

The PS17 feeds paper straight through the printer into a face-up output tray (an expensive option on other printers). This means you see what you're printing as it emerges, and that you can print envelopes without bending them. The printer's software even lets you switch between paper trays or the envelope feeder within a single document, all from the Print dialog box.

The PS17 comes with only 1.5MB of RAM, compared with 2MB or more in other laser printers. That's enough for simple text or graphics, but you need more RAM if you use a lot of fonts or complicated illustrations. Fortunately, the PS17 can be upgraded to 4.5MB. RAM costs about $65/meg from Texas Instruments, less from third-party manufacturers.

Make sure you get the optional AppleTalk interface; you can't use this printer with a Mac without it.

enhanced resolution at a bargain price *(RS/JK)*

NEC's Silentwriter Model 95 ($1750 list) is the only laser printer in its price range to offer *enhanced resolution* (which, as mentioned above, smooths jagged edges and/or sharpens grayscales). It comes with PostScript Level 2 and eleven font families built into its ROM, as well as two megs of RAM, a 250-sheet feeder tray and an envelope tray. Its patented toner and Minolta marking engine print solid black areas beautifully. The Silentwriter is also very easy to use.

Like Apple's Personal LaserWriter NTR, the Silentwriter 95 has parallel, serial and LocalTalk ports and can handle PCs and Macs simultaneously. The Silentwriter's default format for all ports is PostScript, but it comes with a program for PCs that temporarily switches the printer to HP emulation when you send it a print job in that format (you can also send PostScript files from the PC).

As of this writing, NEC is planning a $600 upgrade that will enable the printer to send and receive faxes. (It will print out incoming faxes on plain paper, but like a fax modem,

it won't be able to send paper documents—only files from your Mac.) They will be PostScript faxes, which are far superior in quality to group 2 or 3 faxes, but only if the machines at both ends can handle them (which means they're probably both upgraded NEC Silentwriter 95s). Otherwise, the printer will send and receive Group 3 faxes.

high-end laser printers *(KF/AN/JK)*

We compared the LaserWriter IIg using FinePrint and PhotoGrade with an upgrade board and three high-resolution laser printers. One of these, the LaserMaster LM1000, is a $6000, 1000-dpi laser printer that runs off a NuBus card installed in a host Mac (which means the host slows down whenever other networked Macs use the printer). The LM1000 gave us a lot of problems during our tests, some of which even LaserMaster's tech support people couldn't explain, so we can't recommend it.

very bad feature

We imagine the LM1000 will be discontinued in favor of LaserMaster's more recent printers, like the $7000 Unity 1000, which prints at 1000 dpi and also has a faster, 400-dpi "proof" mode. The Unity comes with 9MB of RAM, expandable to 48MB using ordinary Mac SIMMs, and a 20MB internal hard disk (but you can't expand that by adding an external hard disk). There's no NuBus card to install.

We also tested Varityper's 600 dpi VT600W ($10,000, including installation). It comes with twelve megs of RAM (not expandable), a 20MB internal hard disk and eleven font families (but only nine individual fonts are built in). (You can also get it with a 42MB internal hard disk for $11,000.) Both the Varityper and the Unity work with PCs and other types of computers as well as with Macs.

Finally, we looked at the Xante's AccelaWriter II, an upgrade board that makes it possible for LaserWriter II's to print at 600 dpi (there are also versions for LaserWriter I's and Personal LaserWriter SCs and NTs). The board

lists for $1700, but to that you need to add the cost of a printer to put it in. Six megs of RAM is standard, with upgrades to 8MB, 12MB or 16MB available at $100/meg. The AccelaWriter comes with eleven built-in font families, and you can attach a hard disk for storing others.

In our tests, the AccelaWriter printed faster than the Varityper and the Unity, but slower than the IIg. Its type resolution was just slightly crisper than the Varityper's, but its graphic capabilities left quite a bit to be desired. On a curved hairline test, the AccelaWriter's output showed jaggies and actually faded out in a couple of places. And its grayscale output didn't look nearly as good as the Varityper's. The current version of this board (same list price) apparently handles grayscale better, but Xante couldn't get us one in time to review.

The Varityper handled grayscale the best of all, and its ability to print on 11" x 17" paper can be useful for book covers, posters, etc. But it's enormous (171 pounds) and its fan is so loud it's virtually impossible to work in the same room with it. Finally, because it recycles its toner, you have to use expensive paper at all times (cheaper papers have more dust, which gets into the recycled toner and degrades output quality).

What's more, type and nongrayscale (line) graphics were noticeably crisper on LaserMaster's Unity 1000 than on the Varityper. The Unity is no bigger—or louder—than a LaserWriter, and it costs thousands less than a Varityper.

We did run into a problem with the Unity, however. The superfine toner in LaserMaster's cartridges left white spots and gaps inside the type when we printed on certain reformulated lots of Hammermill Laser Plus paper (and, to a much lesser extent, on ordinary paper as well). Fortunately, we didn't notice any degradation in image quality when we used the regular LaserWriter cartridges instead, so there's an easy way around the problem.

At $4600 list, the IIg costs thousands less than the Unity 1000, and the IIf is even cheaper. Both are faster than the Unity printing at 1000 dpi—although in its 400 dpi "proof" mode, the Unity is just about as fast.

Thanks to PhotoGrade, the gray-scale capabilities of the IIg (or a IIf with upgraded RAM) are terrific—even better than the Unity in some tests, though not quite as good overall. The Unity's handling of line art was superior, but not dramatically so. In both cases, the differences in quality may not be worth the difference in price to you.

However, the tendency of the IIg and IIf's type enhancement program, FinePrint, to break up delicate fonts like Optima (as mentioned in an earlier entry) makes it virtually unusable—so much so that we simply turned it off. So if you plan to use such fonts, or print in any font in sizes smaller than 9- or 10-point, the IIf and IIg aren't up to the job—unless you turn FinePrint off (in which case you've basically got an expensive NTX).

Just too late for us to review it, LaserMaster came out with a new $10,000, 1200-dpi printer (with a 600-dpi proof mode) that handles paper up to 11x17. If they manage to straighten out the toner problem (or if this printer, like the Unity, doesn't require special toner), the LaserMaster 1200 could be an excellent way to get high quality printouts without having to keep running down to a service bureau (although $10,000 would pay for a lot of trips).

HP and QMS also have high-resolution laser printers that compete with the ones discussed in this entry, but neither company could get us evaluation units in time. We'll cover them and the LaserMaster 1200 in an update.

We used a pair of Unity 1000's (with ordinary toner) to print this book and found them to be quite reliable. You can judge the quality of the output for yourself, but we think it's great. We did previous editions of the *Mac Bible*

at 300 dpi, because we didn't feel that the increased quality of imagesetter output was worth the hassle and delay of dealing with service bureaus, but the Unity 1000 gives us everything we need—quality, ease of use and speed.

General printing tips

drivers, Chooser and Page Setup *(JK/SA/AN/SM/ND/KF)*

mostly for beginners

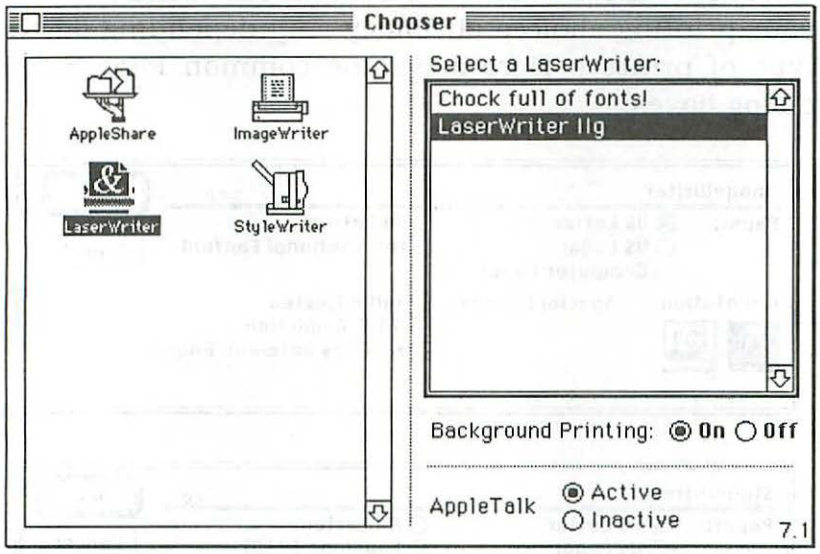
Printer drivers are programs that tell the Mac how to communicate with your printer. Without them, each application would have to contain information about every type of printer you might use. The ImageWriter, StyleWriter and LaserWriter files are common Apple printer drivers. Some third-party printers have their own drivers, although many are designed to use Apple's drivers.

You may not need a separate driver for each type of printer you use; sometimes a single driver works for several related printers. For example, Apple's LaserWriter driver works for all seven PostScript LaserWriters (the SCs and Personal LaserWriter LS aren't PostScript printers and have their own drivers).

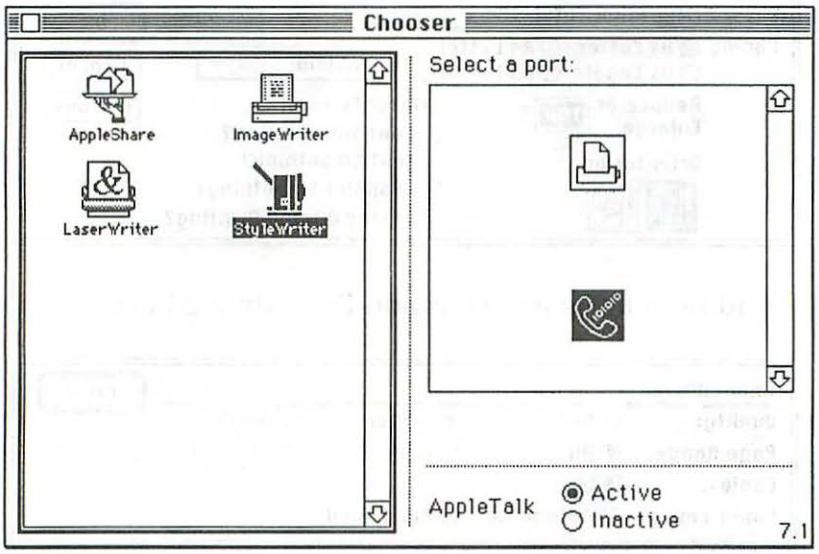
Printer drivers go in the Extensions folder in your System Folder; if you drag them onto the System Folder icon (not the window), the Finder will put them in the Extensions folder automatically. (In System 6, printer drivers go in the System Folder, but not into any folder within it.)

Whenever a Mac has more than one printer to choose from, you have to tell it which one you want to print to. You do that by selecting *Chooser* from the menu and clicking on the icon of the printer you want to use (you're actually selecting a printer *driver*, not a printer). If you click on the LaserWriter icon, a list of available LaserWriters will appear in the list box at the right, as shown at the top of the next page (even if there's only

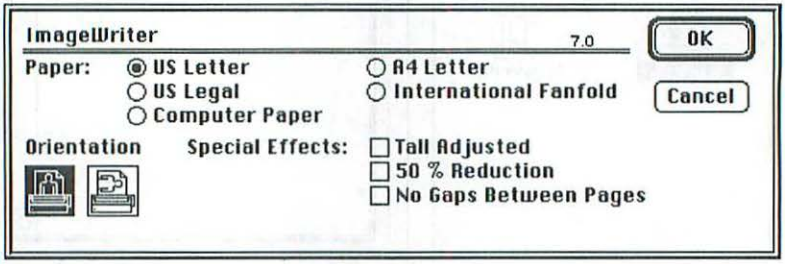
one LaserWriter on the list). If there's more than one, just select the one you want to use.

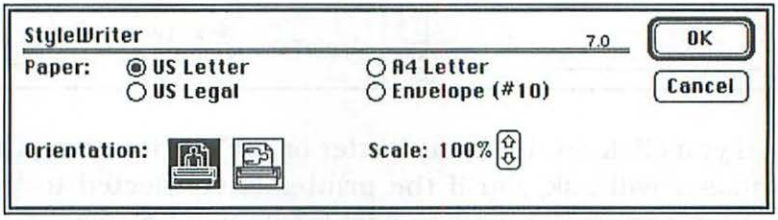


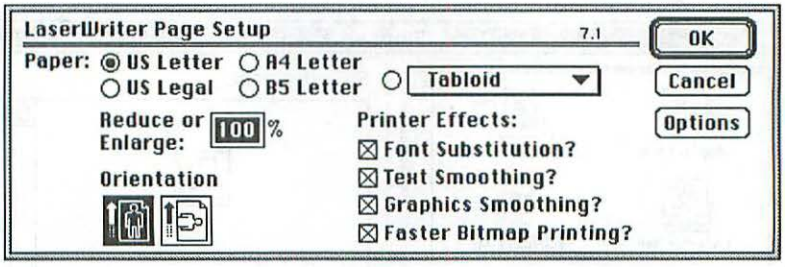
If you click on the ImageWriter or StyleWriter icon, the Chooser will ask you if the printer is connected to the printer port or the modem port (as shown below):



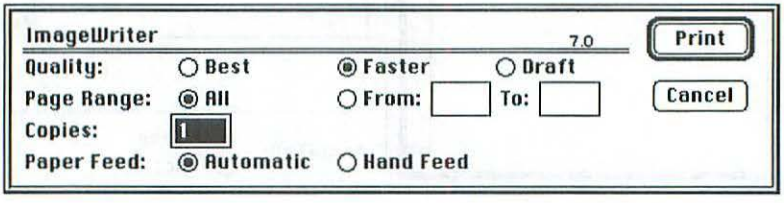
The printer driver you select in the Chooser generates the Page Setup and Print dialog boxes that appear when you choose those commands from the File menu (because your printing choices obviously vary depending on the type of printer). Here are some common Page Setup dialog boxes:

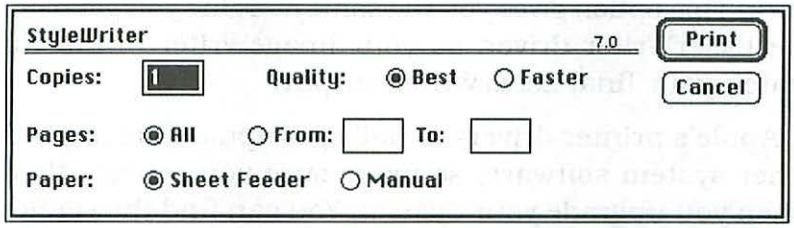


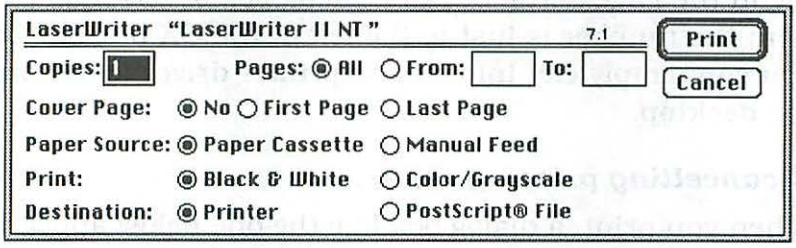




And here are some common Print dialog boxes:







Many applications substitute their own dialog boxes for these basic ones to give you even more printing options.

When you use the Chooser to switch to a different type of printer—from a StyleWriter to a LaserWriter, say—applications need to be informed of that fact, because different kinds of printers use different print areas on the page. You inform the application by opening the Page Setup dialog box and then closing it again (you don't have to change any settings). You should also do the same thing after installing a new printer driver, to activate it.

Because changing printer drivers can change line breaks, page breaks and the like, don't expect to be able to proof a document on a dot-matrix or inkjet printer and go straight to final output on a laser printer. You'll almost certainly have to proof each page that comes off the laser printer as well.

But reader Choong Han Chu told us a way to make one of those transitions a lot smoother if you're proofing on an ImageWriter—just select the *Tall Adjusted* option in the ImageWriter's Page Setup box before you start your

work. This option gives you the same margins you get using the LaserWriter driver, so your ImageWriter drafts will match your final LaserWriter output.

Apple's printer drivers usually get updated along with other system software, so make sure you replace them when you upgrade your System. You can find the version of the printer driver you've selected in the Chooser by looking in the Page Setup or Print dialog box of any application; the number is just to the left of the *OK* button. Or you can simply Get Info on any printer driver icon from the desktop.

cancelling printing *(SA/JK/AN)*

mostly for beginners

When you print, a dialog box like the one below appears on the screen. Each application has its own kind (this one is from Nisus) and not all tell you which page is being printed. There's usually a *Cancel* button, but even if there isn't, you can almost always cancel printing with ⌘., or sometimes the Esc or accent grave (`) key.

> **Press and hold "⌘." to cancel printing.**
> **Printing page 1 of 73.**

important warning

Don't expect instant compliance with your cancel command. Laser printers process whole pages together, and ImageWriters receive pages from the Mac in sections (called *bands).* Either machine will finish printing the page (or band) it's on before paying any further attention to the Mac. This means that if you've asked for 100 copies of a document, cancelling the print job won't stop a LaserWriter from spewing out 100 copies of the page it's working on. The only way you can stop it is by shutting it off.

In either case, the printing dialog box should disappear from the Mac screen while the printer goes merrily on its way. Sometimes this won't be instantaneous either, if the Mac is busy processing something to send to the printer and can't stop in the middle. Your ⌘. sequence is stored until the Mac is ready for keyboard input, so you don't have to keep pressing it to make your point—although repeated pressings won't have any harmful effect.

If you're using any sort of print spooler (described below), you'll have to cancel the printing by whatever method the spooler requires.

Whatever the situation, remember: turning the printer off in the middle of printing isn't going to hurt anything. At worst, a LaserWriter will have a half-fed sheet of paper inside; if it does, just open the case and pull it out.

printing the screen *(AN/SA/JK)*

Printing the image currently on your Mac's screen is easy—if you want to print it to an ImageWriter. All you have to do is hit Caps Lock Shift ⌘4. Shift ⌘4 prints the current *window* instead of the whole screen. (In spreadsheets, the current window is simply the entry bar—the little text box that shows the contents of the selected cell; so if you press Shift ⌘4 in a spreadsheet, that's all you'll get.)

There are two ways to print a screen to a laser printer. One is to get any one of the public-domain, shareware or commercial utilities that let you do that. The other is to save the screen image as a graphic, then print it from disk.

Shift ⌘3 puts an image of the screen, called a *screen dump*, in a file on your startup disk. In System 7 you get the entire screen, whatever size it is. But in System 6, you only get a portion of the screen on full-page and larger monitors; to get a dump of the entire screen on those monitors, use one of the screen capture programs described in the utilities chapter.

✎ *printing from the desktop* (SA/RS/JK)

You can print almost any document from the desktop by selecting it and then choosing *Print...* from the File menu. The program that created the document will open, print the document and then close both itself and the document, returning you to the desktop. (The program has to be either on the startup disk or the same disk as the document.)

But don't select *Print...* and then walk away from the computer, expecting your printout to be ready when you get back. Most programs will go only as far as opening the document and putting the Print dialog box on the screen for you to select the number of copies, the page range and so on. You'll still need to click *OK* to get the printing started.

If you use more than one printer, there are utilities that let you put an icon of each on the desktop, and print a document on the printer of your choice just by dragging the document icon to the printer icon. DTPrinter (freeware) and easyPrint ($30, from SF/O) both do this.

✎ *printing multiple files* (SA)

Some programs let you chain documents so they'll be printed one after another. To do that in other programs, select them all on the desktop and choose *Print* from the File menu. You'll usually only have to deal with the Print dialog box once—the same settings (number of copies and so on) will be applied to all the documents you're printing. After each document is printed, it will be closed and the next one will be opened and printed. When they're all printed, the program will close itself and return you to the desktop.

✎ *printing multiple copies* (AN)

Because most programs take a long time to figure out a page but not very long after that to print it, it's usually much faster to ask for multiple copies of a document than to reprint it several times. Of course, you also have

to consider how long it will take you to collate the sheets into separate sets.

So if your document is in a word processor that really spits out the pages, it may make more sense to print out single copies and avoid collating. But if your document is in PageMaker, say, printing multiple copies and collating (or printing one copy and photocopying that) can save you a lot of time.

print spoolers *(SA/AN/JK/Chris Allen/RS)*

Macs can send out information to printers much faster than printers can receive and process it, so the computer is tied up in the printing process much longer than is really necessary. A *print spooler* is a program that creates a special *print file* on disk that then gets fed out to the printer in chunks, at a rate the printer can handle. Since the Mac creates this print file quite quickly, you can get back to work and leave the computer and the printer to talk to each other in the background. *(Spool* is an acronym for *simultaneous print operations online.)*

Keep in mind that you need enough room on your disk to hold the print file (it will be at least the size of the document you're printing). On some Macs, the other work you're doing will be periodically interrupted as the print file is fed to the printer. If your Mac is fairly slow, you may find it less frustrating to just take a break during printing than to deal with a computer that ignores you for up to a full minute out of every three or four.

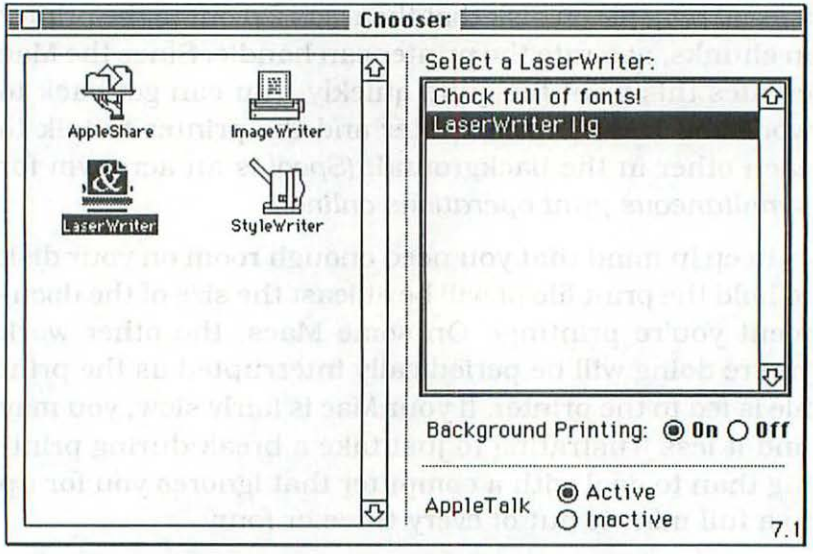
Backgrounder is a good print spooler for the StyleWriter and LaserWriters that comes with the Mac's system software; it works with System 7 and System 6's MultiFinder. (To use it with the StyleWriter, you need a StyleWriter driver that's more recent than version 1.0.)

Backgrounder works with PrintMonitor, a utility that keeps track of what document's being printed, how many

pages are left to go, what other documents are waiting to be printed, etc. On a network, it will also tell you *whose* document is being printed and what other documents are in line to be printed.

PrintMonitor has another nice feature: when the printer needs attention (because it's out of paper, say), PrintMonitor flashes its icon in the upper-right corner of the screen, alternating it with the Application menu icon. (In System 6, it does the same with the menu icon in the upper-left corner of the screen.)

To use Backgrounder, put it and PrintMonitor in your System Folder. Then go to the Chooser, select the LaserWriter or StyleWriter icon, and turn *Background Printing* on.



Many people will have *both* a third-party print spooler *and* Backgrounder running at the same time! Amazingly enough, this often works, but it costs you time, since everything is done twice. And it can cause problems, like locking up your Mac.

SuperMac's $150 SuperLaserSpool works with PageMaker and System 7; that's useful, because Backgrounder and PrintMonitor don't. To give you an idea of how much more quickly a spooler gives you back the use of your Mac, we did a test. We found that it took SuperLaserSpool two minutes to read a 27-page PageMaker file onto the disk, and another twenty minutes to actually print the file out. The eighteen-minute difference is time you get to work on the Mac that you otherwise wouldn't have.

Printer buffers do the same thing spoolers do, but with hardware rather than software. That is, they provide extra memory in which to store a print file. Printer buffers never really caught on in the Mac world—they need too much memory to handle all the Mac's fonts and graphics, and thus are too expensive.

Dot-matrix printer tips

✎ using the Tall Adjusted option *(SA/Larry Pina)*

mostly for beginners

Since the ImageWriter's normal printouts don't match the 72 x 72 resolution of the Mac screen, graphics are distorted (circles become ovals, for example). To avoid that, just choose the *Tall Adjusted* option in the Page Setup dialog box; this tells the ImageWriter to print the same number of dots horizontally and vertically. (Be aware that this will increase the overall width of your document by about 11% and that can cause problems with text or graphics near the left and right margins, particularly with old programs like MacWrite 4.5.)

✎ print modes *(SA/AN/JK)*

mostly for beginners

The ImageWriter driver offers three print modes. In *Best* quality, the printhead makes a double pass, with the second set of dots slightly offset. To do this, the Mac processes a page that's twice the size of the actual one

mostly for beginners

and then shrinks it by 50%. This is no problem with TrueType, but with bit-mapped fonts, it requires a font that's twice the size of the one you want (24-point when you want 12, for example). If the double-size font isn't installed in your System (or an open suitcase file), the Mac looks for one that's four times the size.

To print a high-resolution graphic, shrink it in your application to 50% of its original size and then print it at Best quality. (Of course this dictates how big the graphic will be.)

In *Faster* printing, a single pass is made, which is fine for proof-reading, informal notes, etc. *Draft* mode usually won't print graphics, doesn't know about screen fonts, and can only give you basic type styles like boldface and underline. And to make sure your line and page breaks will be the same as when you print out at higher quality, it puts ugly gaps between words.

very hot tip

For *Best* quality printing, a moderately-used ribbon is best, because the double-strike method tends to smear the ink from a new, or newly-inked, ribbon. But a new ribbon works best with draft-quality output, because the extra smear fills in all those spaces between the dots.

BetterWriter printer drivers *(Larry Pina)*

very good feature

BetterWriters is a set of printer drivers ($70, from GDT SoftWorks) that make the ImageWriter (and other printers that use the ImageWriter's driver) faster and more versatile. They offer a number of LaserWriter-like print options—for example, scaling from 10% to 400% in 1% increments, as opposed to the standard ImageWriter driver's choice of 50% to 100%. You can also center the reduction, flip the page vertically or horizontally, or reverse the image (to white on black instead of black on white).

You get seven alternate paper sizes, to which you can add eight custom sizes (that's great if you use pin-fed invoices,

checks, purchase orders, etc.). The print dialog box offers seven print quality options, instead of the standard three. And unlike with the ImageWriter driver, spacing between words on printouts perfectly matches that on the screen.

The BetterWriters disk also includes drivers for the StyleWriter and the DeskWriter, but these aren't as dramatically superior to the standard drivers.

✎ *faster Draft* (PH/Larry Pina)

According to its manual, the ImageWriter II will print at 250 cps. Needless to say, that's in Draft mode. Even then you need to know a couple of tricks to get that kind of speed out of it.

The first trick concerns fonts. The font the ImageWriter uses in Draft mode is similar to the bit-mapped font Monaco in 10-point. If your document is in any other font (including TrueType Monaco 10), the ImageWriter will try to adjust the spacing between the letters and the words to make them match how the text looks on the screen. It will fail, miserably, but it will try, and the trying takes time.

If you put your document into Monaco 10 before printing it, you will be spared that exercise in futility. (You can also write and edit your documents in Monaco 10, but it's ugly and hard to read on the screen.)

Here's the other trick: for the fastest speed, you not only have to select Draft mode in the Print dialog box, but you also have to select it on the print quality switches on the ImageWriter itself. (These switches only have an effect when you're printing in Draft mode.)

By doing those two things, you'll get printouts in the shortest time possible.

✎ *alternative ribbons* (DC)

From time to time your local supplier may run out of ImageWriter ribbons. This will probably happen late

Saturday afternoon, just before you plan to begin a marathon weekend of printing to meet Monday morning's deadline. If you can't find any ImageWriter ribbons, don't panic—you can substitute ribbons for the C. Itoh 8510, the NEC 8023 and DEC LA50 printers. (If you can't find them either, *then* you can panic.)

sheet feeders *(DC/AN)*

Using fan-fold paper is a lot of trouble. It often gets jammed (particularly on the ImageWriter II, whose tractor feed isn't very good) and when the job is done, you're faced with the task of removing the perforated edges with the holes in them, separating the individual pages and collating them.

A sheet feeder frees you from all that. You can use virtually any kind of paper you please and change it as often as you want. When the printing is finished, the pages of your document are not only separated but also collated. One final advantage: regular 8½ by 11 paper is less expensive than fan-fold paper.

So why doesn't everyone use sheet feeders? Because some are expensive and delicate. Although the sheet feeder Apple sells for the ImageWriter II isn't terribly expensive (it lists for $225), it's not very reliable. If you do buy one, make sure you take out an AppleCare extended warranty on it. (Many other sheet feeders, like those on the DeskWriter and the Olympia NP60APL, seem to work fine.)

printing envelopes *(BB)*

Printing envelopes on an ImageWriter (or other dot-matrix printer) can be a troublesome process. They tend to jam, and minimum margin settings make it difficult to print a return address in its usual location in the upper left corner. There are more complicated ways around this problem, but here's the simplest: just feed the envelope into the printer with the flap open and compensate by adding as much length as you need to the top margin.

My return address is already printed on my envelopes, so all I need to print is the recipient's address. I set my top margin by measuring down from the top of the closed envelope to the first line of the address (1.75" on my envelopes) and adding another inch for the flap (for a setting of 2.75").

If you need to print your return address, just measure how far you want its top line to come below the top edge of the envelope and add an inch to that figure—or whatever distance works for the flaps on your envelopes. (I think the response of the ImageWriter's paper sensor depends on where the edge of the flap meets the sensor.)

The natural curl of the envelope flap can cause the envelope to wrap around the *platen* (the paper roller). To avoid that, just bend the tip of the flap back a little before you feed it.

Inkjet printer tips

don't let cartridges dry out *(ND)*

Try to avoid opening a new ink cartridge if you know you're not going to be using your printer for awhile—the ink will dry up before you get a chance to use it. Standard DeskWriter cartridges normally print about 300 pages, but my friend Tom's newly opened cartridge languished for six months and then ran out of ink after only 50 pages. Take his advice and change the cartridge *after* your vacation.

unclogging ink cartridges *(ND)*

Sometimes ink clogs some of the fine holes in inkjet printheads, so you see blank stripes in whatever you're printing. To clear the holes, you can try pressing the *Prime* button on the DeskWriter, but that doesn't always work—and it shortens the life of the cartridge.

Instead, try printing a heavily inked page one or more times. You can make a suitable page to print by going into a graphics program, drawing a box that fills a whole page, and filling it with black (or a dark pattern).

prime mechanism upgrade *(ND)*

Early DeskWriters have prime pumps that can malfunction and create a messy ink spill inside the printer near the ink cartridge. These defective pumps sometimes make clogged printheads worse, rather than fixing them. HP offers a free upgrade kit to owners of DeskWriters with serial numbers whose first four digits are lower than 2937.

refilling inkjet cartridges *(RS)*

You can save a lot of money by refilling your printer's ink cartridge instead of buying new ones. A cartridge can be refilled ten or more times before it needs to be replaced. JetFill sells a syringe-like device that comes with smear-resistant black ink ($10) or colored ink ($11), about $10 less than buying a new DeskWriter or StyleWriter cartridge.

If you want to save even more money, you can make your own refill kit. The method described below is for the DeskWriter, but you can probably also use it with the StyleWriter, even though it has a different type of ink reservoir.

All you need is a syringe and some ink. A medical syringe with a needle works best; otherwise a hobby syringe (meant for model airplane glue) will do. Hobby stores sell them for around $1.50.

For ink, I recommend Sheaffer Skrip (about $2 for two ounces; if you want black ink, get their *jet black).* It's water soluble and smears more easily than HP's ink, but it's a lot cheaper and shouldn't clog up the printhead as much. One bottle will fill the cartridge about five times. (DeskWriter cartridges have a sponge in them that holds some black ink even after they're empty, so don't try to refill them with colored ink.)

To refill the cartridge, take it out of the printer (if the printhead is clogged, soak it in alcohol to clean it). Put 12 cc's of ink in the syringe. If your syringe isn't graduated, measure the ink separately, or gradually fill the cartridge with small amounts of ink.

Put the tip of the syringe over the hole in the top of the cartridge. Seat it as well as you can and then inject the ink. You can expect some overflow from both ends of the cartridge, so do this over a sink; since the ink's water soluble, you can clean up with soap and water.

✎ *paper for crisper print quality* (RS)

If you look closely at an inkjet printer's output, you'll notice that the ink spreads a bit into the fibers of the paper, creating a fuzzy edge around everything. You can reduce this by using the right paper.

What's the right paper? To some extent, that depends on the printer and the kind of ink you use. See what the printer manufacturer recommends, and experiment.

If you're willing to pay for it, clay-coated paper made specifically for inkjets will give you the best results. It virtually eliminates spread, making output from an inkjet almost as crisp as a laser printer's.

✎ *DeskWriter drivers* (Larry Pina/RS/ND)

Early versions of the DeskWriter driver didn't work well with System 7's memory features. If you tried to print with virtual memory on, you'd get an alert that said, *Datacomm buffer overrun—no DTR handshaking.* If you had 32-bit addressing on, you'd get a system error when you issued the *Page Setup...* or *Print...* commands. HP fixed these problems in version 2.2 of the driver. Version 2.2 also made it possible to use fonts like Sonata (for music notation) that use negative kerning to make characters overlap.

As of this writing, the current version is 3.1, which increases printing speed, uses better dither patterns for

printing grayscales on the DeskWriter C and includes a spooler for background printing. You can get the latest driver from user groups, online services and bulletin boards, or by calling StarPak at 303 353 7650.

❦ networkable DeskWriters *(Larry Pina)*

If you're buying a used DeskWriter to be shared by Macs on a network, make sure it's the newer model, HP2279A, which has a blue *DeskWriter* label. The original model, HP2278A, isn't networkable (its *DeskWriter* label is red).

Laser printer tips

A lot of the information in the following three sections applies to all laser printers and a lot of it only applies to those that use PostScript. Similarly, much of what we say about LaserWriters applies to other laser printers—particularly if they run off the LaserWriter's print driver. It would be tedious for us to identify each entry, and it's easy for you to tell, so please just use your judgment.

❦ naming your printer *(SA/JK)*

mostly for beginners

The LaserWriter Utility program (it comes with LaserWriters) lets you name your printer anything you like. (The name appears in the Chooser desk accessory when you select the LaserWriter driver icon.) Renaming LaserWriters (they start out as *LaserWriter IINT* or *LaserWriter IIg* or whatever) is possible at any time, but it's absolutely necessary on a network that has more than one LaserWriter. Otherwise, your printout might end up in another room, on another floor, or even in another building.

❦ the Laser Prep file *(SA/JK)*

When you're using a LaserWriter, you need both the LaserWriter driver and the Laser Prep file (make sure they have compatible version numbers). The LaserWriter

file goes into the Extensions folder in the System Folder and Laser Prep just goes into the System Folder, not into any folder within it.

The Laser Prep file is a sort of dictionary of special PostScript terms that the Mac needs to communicate with the printer. It bridges some of the differences between PostScript (the language the printer uses) and QuickDraw (the language the Mac uses to draw its screen images). It also interprets the special PostScript files that the Mac sends to the printer, which aren't quite standard but are optimized for speedy transmission.

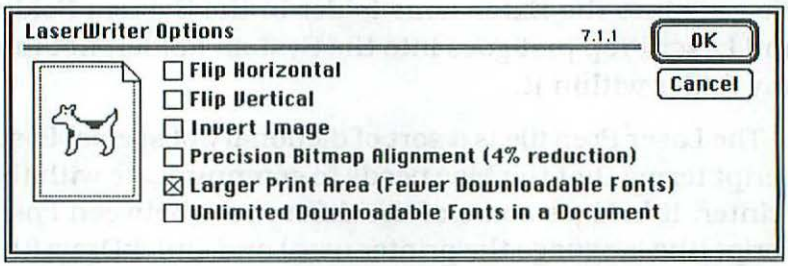
LaserWriter Page Setup options *(AN/SA/Chris Allen/JK)*

mostly for beginners

The LaserWriter driver gives you a number of useful features in the Page Setup dialog box. One of these is *Faster Bitmap Printing*, which preprocesses bit-mapped images before they're sent to the LaserWriter. Apple states that "in rare cases, some documents may not print with this option turned on," but we've never experienced that. If it happens to you, just turn the option off and try again.

The *Graphics Smoothing* or *Smoothing Bitmap* option removes some of the jagged look bit-mapped graphics might otherwise have—for example, the stair-step effect around curves turns into a slightly squiggly line. This option is only for Apple's LaserWriters, not for other brands of PostScript printers. Some programs (like PageMaker) have smoothing routines of their own that work on all PostScript printers.

Clicking on the *Options* button gives you several additional choices. (A dog of indeterminate breed—with a very thick tail—demonstrates the effect of each option as you select it.) For example, you can flip the entire image on the page vertically or horizontally, or "invert" it (change whites to blacks and blacks to whites).



Precision Bitmap Alignment improves bit-mapped graphics by reducing the entire image on the page to 96% of its normal size. This gets around the incompatibility between the 72 dots per inch of the Mac's screen and the 300 dots per inch of the LaserWriter's output (300 divided by 72 is 4.1666, but 96% of 300 is 288, into which 72 goes exactly 4 times).

There's a neat trick that avoids having to reduce the whole document—just enlarge the graphic to 104% of its original size (of course this only works in documents that give you that precision). But be aware that neither this approach or *Precision Bitmap Alignment* will work if the graphic has already been reduced or enlarged from its original size.

Larger Print Area lets you cover more of the page. It tells you that the trade-off is fewer downloadable fonts, but even a font maniac like Arthur virtually never runs into that limit (and he always checks that box).

❦ *back-to-front printing* (AN)

Most laser printers stack their printout pages in order (1, 2, 3, etc.) but some, like the LaserWriter I's, stack them backwards (3, 2, 1). If you have one of these dinosaurs, use the *Back to Front* option (it's in most Print dialog boxes).

❦ *feeding single sheets on the LaserWriter II* (AN/JK)

The LaserWriter II will pull a single sheet of paper from the slot on the top of the paper tray whether you tell it to or not. So if you're working on a non-networked Laser-

Writer II, all you have to do is put a sheet of paper in the slot; you don't gain anything by clicking the *Manual Feed* button in the Print dialog box.

But if you're sharing the printer on a network and do this, someone else's print job may use the single sheet first. So click the *Manual Feed* button and your Mac will tell you to insert the sheet when the printer is ready for your job.

suppressing the LaserWriter's startup page *(AN/SA)*

mostly for beginners

Every time you turn on the LaserWriter, it spits out a rather attractive test page that tells you how many copies have ever been printed on the machine. While it's possible to get into this constantly mounting total as a measure of your productivity (and therefore your general worth as a human being: *I've printed 3217 pages on my LaserWriter—I must be doing something useful with my life*), it does cost you about 3¢ in toner, some fraction of a cent in paper and some hard-to-figure but probably significant amount of wear-and-tear on the machine.

So it's sometimes nice to be able to turn off the startup page, at least for a while. The easiest way to do that is to use the LaserWriter Utility program (if you can't find the one you got with your LaserWriter, you can copy it for free at an Apple dealer).

flashing messages and lights *(AN)*

mostly for beginners

When a Mac is collaborating with a LaserWriter to figure out how to print a document, a message appears on the Mac's screen that lists its *status* as *processing job.* With certain combinations of hardware and software, this message may flicker off and on again every five seconds or so.

Do not panic (as I, of course, did the first time it happened). The periodic flashing doesn't mean that the power pole outside your house is about to fall over, or that enemy aliens from Saturn are trying to destroy your Mac

by sending power surges through the house wiring. They may be—probably are, in fact—but the flashing message has nothing to do with it.

It's just a way of reminding you the Mac is thinking.

The LaserWriter II lets you know it's thinking by flashing its green light every two seconds. (Double-flashing indicates a *wait* state, which usually doesn't last more than 30 seconds.) The LaserWriter I has a yellow light for the same purpose.

When the Mac's role in the printing collaboration is done, the status message will disappear from the screen, but a page still may not have emerged from the LaserWriter. *Do not panic* (as I, of course, did). The LaserWriter is still thinking on its own about how exactly to print the document; you know that because the light is still flashing.

You're free to continue editing the document, to close it, to quit the application or whatever. The LaserWriter will print the document eventually, all in its own good time.

laser printer hangups *(AN)*

Laser printers sometimes get confused and hung up (just like the rest of us). When this happens, restart the printer with the LaserWriter Utility (or some similar program). If that doesn't help, restart your Mac (with the *Restart* command on the Special Menu).

If there's still a problem, turn both the Mac and the printer off and wait five minutes before turning them back on (check all the cable connections while they're both off). If even that doesn't help, replace your printer drivers. If *that* doesn't help, reinstall your system software as described in Chapter 4.

If you're *still* having a problem, it may actually be in the hardware.

printing custom stationery and envelopes (AN)

Access to a laser printer can not only save you the expense of buying stationery, it can allow you to modify your stationery as often you like. You can change the text, the fonts, the graphics or the paper you print it on. (On a laser printer, it's just as economical to produce a batch of five sheets of letterhead with matching envelopes as it is to produce a batch of five hundred.) Custom stationery makes a wonderful present, particularly if you use fancy paper and spend some time making the stationery match the recipient's personality.

There's no special trick to doing letterhead on a laser printer. (There are some general tips on the subject in the second section of Chapter 9.) But envelopes can be tricky. With most printers, you have to hand-feed them, face up. Certain kinds of envelopes don't feed very well—like ones made from "parchment"-type or "laid" paper. (They also don't take toner well.)

You may find yourself frustrated by some laser printers' inability to print closer than a quarter of an inch to the edge of the envelope. But a reader named Mike Chan wrote in with a neat trick. He uses Post-it notes to trip the paper guide (he sticks them on the envelope with about a quarter of an inch protruding). He says he's only had to open his LaserWriter two or three times to retrieve Post-its that have fallen off inside.

Mike also said that a toner cartridge recharging company told him that running envelopes through a laser printer will ruin the drum inside the cartridge (from glue melting off the flap, I assume) and that they didn't recommend recharging cartridges if envelopes have been run through the printer they were installed in. (For more on this, see the entry on labels and envelopes in the section below on laser-printer supplies.)

how to get rich, deep blacks *(DC/AN/JK)*

Buy a LaserWriter II, a Personal LaserWriter or some other laser printer built around Canon's SX or LX marking engines (or a NEC Silentwriter). The LaserWriter I's and other laser printers built around Canon's CX marking engine simply can't do it. Black areas of any significant size will contain small white splotches or streaks, regardless of where you put the print density dial.

This is only a problem with areas of black, not regular text—which tends to look good no matter how low you set the print density dial. And it's also only a problem if the printer's output is used as the final product. If you have it offset-printed, the black areas will almost always fill in. You can even get the same result from a photocopy machine (usually). In any case, don't bother turning the dial all the way to high on a CX machine—you'll just be wasting toner for no purpose.

basic LaserWriter maintenance *(Rich Wolfson/JK/AN)*

LaserWriters are extremely durable machines. Rich has some that have printed more than 100,000 copies and haven't given a single moment of trouble—even though they get heavy use from novice users.

Basic maintenance for LaserWriters amounts to little more than careful cleaning. Cleaning materials and instructions come with every new toner cartridge, but we suspect a lot of people ignore the instructions and just pop in the new cartridge. This will cost you time and money in the long run.

One spot the cleaning instructions don't mention is the covering over the laser diodes. To find them, open the printer, remove the cartridge and look up underneath the lid (they're in the lid). In LaserWriter II's, the covering is overlaid by a metal piece so it shows as a series of red rectangles. (You can't see it if you don't take out the

cartridge.) In the I's, the covering is a red strip running almost the width of the lid.

If a LaserWriter gets very dirty, you may need to vacuum out the insides. A vacuum like a Dustbuster is going to be moving dry air across a piece of plastic and thus will build up a static charge, like the one that builds up on a plastic comb when you run it through dry hair. Static charges can zap electronic circuits, which will leave you with a dead LaserWriter. (This warning goes double for vacuuming the inside of your computer.)

3M makes a vacuum specifically for electronic equipment; it has a conductive and grounded nozzle so there's no static buildup, but it costs about $250. If you can't find something like that, don't vacuum; just blow air in with your mouth (taking care not to drool).

where to put your laser printer *(AN)*

Most laser printers make a fair amount of noise. They're nothing like the average PC, which sounds like a commercial jet testing its engines, but they still can be pretty annoying. (This is particularly true if you're lucky enough to have a quiet place to work; in the typical office environment, you may barely hear a laser printer.)

Laser printers also produce ozone, a respiratory irritant (unless you live in LA, in which case you're used to it) and spray tiny particles of toner into the air. *[I was once part of a study that found that people who worked near photocopy machines often developed asthma from exposure to the toner in the air. Laser printers use the same type of toner.—RS]*

One way around these problems is to put the laser printer in a closet. Almost any closet is large enough, and if the printer is connected on LocalTalk (for which you can substitute regular phone wire), there's no problem with the cables not reaching. (SCSI cables can go only

about 15 feet, so this solution may not work for Personal LaserWriters and other laser printers that use cables rather than wires.)

I kept two different models of LaserWriters in a closet with just 8" to the front, 7" to the rear and a couple of feet to each side of the printer, and had no problems with insufficient ventilation or heat buildup. (Because closets usually have no windows and often have no external walls, the temperature tends to vary less than it does in regular rooms.)

If you're really worried about heat buildup, hang a thermometer on the closet wall and check it regularly. I did that and mine never registered above 80°—even on days when it was hotter than that outside and when the LaserWriter had been on for many hours (although, admittedly, it never gets really hot in Berkeley—the average high temperature during the hottest month is just 72°).

The LaserWriter's manual says the temperature of the air around the printer shouldn't get over 90°, which means that if you live in New Orleans or some other place where the sidewalks melt in the summer, you're going to need air conditioning to stay within their specs (which also call for humidity of 80% or less). But if you live in a place like that, a laser printer in your closet isn't going to be the only reason you need an air conditioner.

There is, of course, one major disadvantage to putting your laser printer in a closet—you have to get up and walk over to it each time you want to look at the output. I didn't find this bothersome; in fact, I enjoyed the break and the exercise (if walking ten feet can be called exercise). But it could get annoying, particularly if you're doing a lot of trial-and-error futzing with a document.

But closets are only the beginning. After my laser printer had been in the closet for several years, a vision appeared to me and spake thuswise: "Closets are for

clothes, you shmendrick!" I immediately grasped the implications—I could take all those clothes I had no room for in my bedroom closet and put them in the closet in my study. What a revelation!

But where would I put my laser printer? In the basement, of course, where the noise, ozone and aerosolized toner would *never* be a problem. (Since LocalTalk will run on phone wires, you can use the unused yellow and black wires in the existing phone wires in your house. LocalTalk networks are good up to 1000–3000 feet, depending on the cabling you use.)

This new arrangement is a little tiresome when I'm printing many different versions of a short document (the constant tromping up and down the stairs makes me feel like I'm in an amateur production of *Arsenic and Old Lace)*, but I get a lot more exercise.

You have no basement, you say? Actually, I'm trying to make a more general point: *You can put a laser printer just about anywhere you want. There's no law that says it has to sit next to your Mac.*

halftones on laser printers *(AN)*

Laser printers handle text so nicely, it's tempting to use them to produce everything that goes on the page, including pictures. But certain kinds of images have to be processed before you can print them. Here's why:

All printed material is made up of either text or *art* (which is what every graphic element except text is called). There are two kinds of art—*line*, which contains no grays, and *continuous-tone*, which does (the name comes from the fact that the tones form a continuum, from black through gray to white).

Continuous-tone art presents a problem: since printing ink is black (or whatever) and paper is white (or whatever), how can the grays be represented?

Far and away the most common solution involves putting a screen over the photograph. (It's called a screen because the original ones were made of fine metal mesh, although many screens today are sheets of plastic with dots printed on them.) The screen converts light grays to tiny black dots on a white background, and dark grays to tiny white dots on a black background. From a normal reading distance, these dots—in many different sizes—look like various shades of gray.

Once a continuous-tone image has been screened, it's called a *halftone*. If you hold a magnifying glass to a halftoned picture (virtually any printed picture will do), you'll see the little halftone dots, but you won't find them on a continuous-tone photograph like a snapshot.

In the traditional screen approach to halftoning, you leave a space in your document for the graphics and they're added manually at a later stage by the print shop. To integrate halftones with text in your document, so you can print both out on a laser printer simultaneously, on the same page, you need a device called a *scanner* (discussed in Chapter 13) that can capture continuous-tone images and halftone them electronically.

Scanners vary in *sampling density* (how many times per inch they look at the picture) and in how many *levels of gray* they'll pick up. They also vary in quality and price (of course). Once a scanner has captured the image—typically in the TIFF format—you can use various programs to play with it (the software for doing that usually comes with the scanner).

Everything else being equal, the quality of a halftone depends on how many lines per inch it breaks the picture into. The higher the number of lines, the better the photograph looks. The coarsest screen in general use is 65 lines per inch. Newspapers typically use an 85-line screen, magazines a 120-line screen and books a 120-line, 133-line or 150-line screen.

Laser printers and imagesetters each have a default screen frequency that the manufacturer has picked to produce the best output on that particular device. On a 300-dpi printer like the LaserWriter, it's usually 60 lines per inch *(lpi)*; on the Linotronic 300, 120 lpi. You can vary this frequency somewhat (if you know how to do simple PostScript programming), but if you go too far from the default, the results may not look very good.

The LaserWriter's basic resolution of 60 lpi is just below the usual minimum standard for halftones, and you can't expect an image printed at that resolution to look like the ones in magazines and books. But the quality is good enough for some purposes, and the quality produced by a LaserWriter IIf or IIg using PhotoGrade is much better.

❦ *saving as a PostScript file* *(SA/JK/Larry Pina/AN)*

You can turn any Mac document into a PostScript text file that can then be printed on any PostScript device, without any need for the application that originally created the document. With version 7.0 or later of the LaserWriter driver, this is easy. You just open the document and choose *Print* from the File menu. In the Print dialog box, click the *PostScript File* button. The *Print* button becomes a *Save* button. Click on it and you'll get a dialog box that asks you where you want to put the file and what you want to call it.

With earlier versions of the LaserWriter driver, there was no *PostScript File* button to click; instead, you had to click the *OK* button and press ⇧⌘F within about a second. (If you didn't press ⇧⌘F fast enough, the document would print rather than be saved as a PostScript file.)

The PostScript file created by either of these methods can be opened (and altered, if you know what you're doing) in any word processor. To print it, you don't open it and then choose *Print...*; that will just give you a printout of all the PostScript commands in the file. Instead,

you *download* the PostScript file to the printer the same way you do fonts, with LaserWriter Font Utility or a similar program.

Fonts on laser printers

All the font-related terms used in this section are defined and discussed in Chapter 6. For much more on all this, look there.

printer font basics *(AN/SA/JK)*

mostly for beginners

To print PostScript fonts, you need two versions of each font: the screen font and the printer font. (TrueType fonts don't require printer fonts, and bit-mapped fonts don't have them.) The *screen font* is what appears on menus and is displayed on the screen; you install it in your System file or in an open suitcase. The printer only requires one size of a screen font; installing other sizes simply makes it easier for you to view the font on the screen.

The *printer font* tells printers how to form characters. Some PostScript printers have printer fonts built into their ROM, like the eleven font families that come with LaserWriters (they're listed in the entry on LaserWriter I's above). To get other PostScript fonts, you have to buy them on disk. You put their printer fonts in your System Folder and the printer downloads them automatically when you use them in a document. (Don't change the name of a printer font, or the automatic downloading process won't work.)

important warning

You can also store printer fonts on a hard disk attached to a laser printer or in a file server on a network. The utilities called Suitcase and MasterJuggler both let you put them in any folder that contains an open suitcase, and another utility called Set Paths lets you put them in any folder at all (you just show the Mac where they are). Both programs are described in Chapter 7. There are tens of

thousands of downloadable PostScript fonts on the market today; see Chapter 6 for some samples.

bit-mapped fonts on PostScript printers (AN)

When a bit-mapped font is downloaded to a PostScript printer, the printer creates a special PostScript version of it. (Many people don't realize that.) These PostScript versions print more smoothly than the bit maps and they also scale much better. But slanting doesn't work too well—which means that they may not look great in italic or oblique. The PostScript versions have two other disadvantages: they take much longer to print and they strip out most of the typestyle variations you get on a dot-matrix printer.

If you leave the *Font Substitution* button checked in the Page Setup dialog box, PostScript won't create outline versions of New York, Geneva or Monaco; instead, it will substitute Times for New York, Helvetica for Geneva and Courier for Monaco *[and will probably screw up your carefully laid-out formatting in the process—RS]*. You also get Courier when there's not enough room in the LaserWriter's memory to download the font you really want.

type styles on laser printers (AN)

All type styles in bit-mapped fonts are produced algorithmically—that is, by the application of a rule like *increase the width 10%* (to create boldface) *or slant right 11°* (to create italic). But many outline fonts have their own separate *cuttings* for bold, italic and bold italic—that is, all the characters in those styles were individually designed, as if for a separate font.

Separate cuttings give you better-looking characters than you get with an algorithmically derived style, but you have to install a separate printer font for each one. In fact, you can always tell whether a particular type style is algorithmic by looking to see if there's a separate printer font for it; if there isn't, the style is algorithmic.

Fonts with separate cuttings come with screen fonts to match; they give you a cleaner representation of the type style on the screen, but you can save room in your System file by not installing them. Just select the type style you want from the Style menu and PostScript will know to look for the correct printer font.

Some fonts also have separate cuttings for variations with different names than bold, italic, outline or shadow. In these cases, you do have to install the screen font—unless the style is basically a variation on bold or italic. If it is, it will normally be "mapped" to the menu option. For example, *demi* type is bolder than regular, so selecting text set in Souvenir and then choosing *Bold* from the menu will give you Souvenir Demi (that is, if you don't have Souvenir Bold around).

Generally, font publishers try to do what makes sense; if a font comes with four variations, you can usually get them by choosing plain text, bold, italic and bold italic (usually, but unfortunately, not always).

❦ *special characters on laser printers* (AN)

As a general rule, outline fonts give you a wider selection of special characters than bit-mapped fonts. But many outline fonts borrow some of their special characters from the Symbol font. Many, if not most, PostScript laser printers have Symbol in ROM. If yours doesn't (and you want the full range of special characters), make sure Symbol's printer font is in your System Folder (or in one of the other places where it will be found).

❦ *hard disks attached to laser printers* (SA/RS)

When you attach a hard disk to a laser printer, only some of it is used for the printer fonts. The rest becomes an extension of the printer's *font cache*—where the currently used fonts are stored. Without a hard disk attached, the printer purges fonts from its memory to make room for

the most recent ones as they're downloaded, but with a hard disk attached, the purged font is temporarily stored on the disk for easy and quick retrieval. (This is a form of virtual memory that LaserWriters had long before System 7 gave it to Macs.)

how fonts affect laser printers' speed (AN)

Laser printers process some kinds of fonts faster than others. Fonts in ROM are the fastest. Downloadable fonts are slightly slower. Bit-mapped fonts are the slowest, because the printer not only has to download them but also has to create a PostScript version of them. TrueType fonts, and ATM's renditions of PostScript fonts on QuickDraw printers, also take longer than PostScript fonts, but if your Mac and printer are fairly fast, none of these speed differences may be very significant.

Obviously, the more fonts (of any kind) you use, the longer it will take to print a page. So you'll get the very fastest speed out of a laser printer if you use just one font in ROM in just one style—and, because scaling also takes time, in just one size. But that's quite a sacrifice to make for a little speed.

If you use more fonts than a laser printer's RAM can accommodate, it won't print the page at all. This is particularly a problem on low-memory printers, as described in the next entry.

using lots of fonts on low-memory printers (AN)

Don't. (I'll resist the temptation to make this the shortest entry in the book.)

By the time a PostScript printer with 1.5MB of RAM—like Texas Instruments' PS17 or Apple's LaserWriter I—finishes imaging the page and doing other necessary tasks, it only has about 210K of RAM available for downloading fonts and other necessary information.

To give you an idea of just how limiting that is, consider that PageMaker takes about 50K for its header (the PostScript instructions it gives to the printer) and that the necessary QuickDraw information takes another 90K. This leaves only 70K for your downloadable fonts, which usually require between 20K and 35K each. (Other programs often have somewhat smaller headers and thus leave slightly more room for fonts to be downloaded.) In addition to the space the fonts themselves take up, another 10K or so has to be downloaded along with the first font; it contains information that applies to all fonts.

In most applications, you only have room to download three or four fonts; under some extreme circumstances, there may only be room for two. And remember that if bold, italic, bold italic or some other style comes in its own cutting (that is, if it's been separately designed and comes as a separate font file), it counts towards the total just like a completely different typeface.

(One exception to this is special cuttings labeled *oblique.* They're usually derived algorithmically—that is, by the application of a rule—and take up much less of the printer's memory. For example, ITC Glypha Oblique only takes up 3K if you already have Glypha Roman loaded, since all that needs to be added are the PostScript instructions on how to tilt the letters.)

If a document won't print, it's always worth trying to print it again; it often works the second time. If that doesn't work, try printing the document one page at a time. If that doesn't work, try breaking it into smaller documents.

If you're not sure that too many fonts is the reason the LaserWriter won't print your document, the easiest way to find out is to make a copy of it, change all the text to Times or Helvetica, and try printing that. If that works, your problem is almost certainly too many fonts.

To get around this limitation, some applications use *note format*, which gives half-inch margins all around (on the assumption that you're not going to want to print anything closer to the edge of the paper than that). This gives you room for more fonts, theoretically as many as eight or ten. But don't count on it.

Severe limitations on how many fonts you can use can be quite annoying. Luckily, most PostScript printers being sold today either come with at least 2MB of RAM, or let you add RAM to what they come with.

Laser printer supplies

what kind of paper to use (AN)

Laser printers put images down on paper in exactly the same way as photocopiers do; in fact, the guts of the LaserWriters (and of several other PostScript laser printers) are identical to those of many Canon copiers. So the kind of paper specifically designed for use in copiers—often labeled *xerographic*—is what you want for laser printers.

Copier paper comes in more than one grade. When you're preparing originals for presentation, you'll naturally want to use a nice-looking, heavy, opaque paper, or one of the special papers made specifically for high-quality laser-printer output (described in the next entry). But for everyday use, and when you're preparing documents to be reproduced, use the cheapest kind you can find. Here's why:

When the humidity is high, pieces of paper tend to stick together. To help them separate more easily, paper manufacturers put powder between the sheets. This is called dusting, and the more expensive a paper is, the more dusting it tends to have. The problem with dusting is that particles of the powder tend to get bonded to the paper along

with the image, producing a rough, uneven surface. So cheap paper, with little or no dusting, is best.

Cheap paper has another advantage: because of its low fiber content, it has a smoother surface than most expensive paper (except those specifically designed to be smooth). The smoother the surface, the more precise the image bonded to it will be. (Cheap paper has, of course, one final advantage—it's cheap.)

If there's a discount paper supply house in your area that sells retail, you should be able to buy inexpensive copier paper for about $3 a ream (500 sheets). But the cheapest source for paper is generally a wholesale discount warehouse like Costco, Price Club, Office Club or Bizmart. You have to be a member (small businesses, independent professionals, government workers, organization members and the like qualify) and be willing to buy ten reams at a time, but if you are, you can get plain 20-lb. bond for about $2 a ream.

Except in an emergency, it makes absolutely no sense to go into a stationery store and pay $6–$7 a ream when you can get the same paper for half the price or less elsewhere.

high-quality laser paper *(SA/EF/AN)*

High-quality, hard-surfaced, clay-coated laser paper (made by Hammermill and others) can really make a difference. Your business correspondence may not require the added quality, but if what you're printing out is going to be reproduced, you want the crispest original you can get. Use cheap paper for all the drafts and the good stuff for the final output.

Imaging Products sells a wide variety of laser papers, labels and special items like no-tear paper, and are always adding new products. Paper Direct has a wide variety of colors and weights, and a good selection of recycled laser and copier paper. Their Recycled LaserSharp DTP paper

is bright white and has a smooth surface. (See Appendix B for contact information on both of these companies.)

labels and envelopes for laser printers *(AN/SA)*

Don't run anything that contains glue through a laser printer unless it's made especially for that purpose (or for use in a photocopy machine). The heat in the printer can cause labels to peel off inside, and can seal envelopes.

Avery makes labels specifically designed for laser printers. Because a special adhesive is used, the labels don't peel off when subjected to the high heat inside the printer. We've used them at the office and haven't had any problems with jamming. They come in three sizes: 1" x 2⅝" (product codes 5160 and 5260), 1" x 4" (product codes 5161 and 5261) and 1½" x 4" (product codes 5162 and 5262) and are available at most office supply stores.

nonstandard stocks *(SA/AN)*

If you have trouble getting thick stock to go through a LaserWriter II, open the back and let the printed material come out there, instead of having to bend around the second set of rollers to come out the top.

Regular transparency film goes through a LaserWriter with no problems, but don't use just any old piece of plastic—like, say, a report cover. For crisper output, use transparency film made specifically for laser printers. (Imaging Products sells it in clear, red, yellow, green and blue.)

getting the most from toner cartridges *(AN/SA/JK/KF)*

Before installing a new toner cartridge in a LaserWriter, you should rotate it gently from side to side (that is, lift the right side, then the left—it's *roll* you want, not *yaw*). If you don't do this, the images you get may not be dark enough. (You may also have to break in the cartridge by printing thirty pages or so.)

There are two things you can do to get more pages printed from each cartridge. First, use the *print-density dial.* It's on the inside of LaserWriter II's (it's green and near where the edge of the lid lifts) and on the outside of LaserWriter I's. When the cartridge is new, set the dial at 9—which, in a masterpiece of counterintuitiveness, is as *low* as it will go.

When you're getting to the end of the cartridge and faint areas start appearing on your printouts, turn the dial up (in other words, towards 1). But wait—don't touch that dial! First, try rocking the cartridge, as described in the first paragraph above, and keep doing that whenever you have a problem. Only when this fails to produce the desired result, or only produces it for a few pages, should you turn the print density dial down...er, up...toward 1.

Using those two simple techniques, we've been able to average about 5000 pages on both LaserWriter II and LaserWriter I cartridges, including refilled ones, with perfectly acceptable quality.

buying toner cartridges *(AN/RS)*

If you can't find an Apple-brand toner cartridge for a LaserWriter, a Hewlett-Packard LaserJet cartridge works just as well. The cost to the dealer for both brands is the same, so the price you pay should be too.

If you have a Personal LaserWriter, any toner cartridge made for a laser printer with a Canon LX engine will work for you. If you have a LaserWriter II, you need a cartridge made for a printer with the Canon SX engine. And if you have a LaserWriter I (the original or the Plus), you need a cartridge made for the Canon CX engine. (Canon copiers also use the CX and SX marking engines, but their cartridges won't work in laser printers.)

refilling toner cartridges (ByB)

Toner cartridges are your greatest expense in operating a laser printer. Fortunately, you can have your cartridges refilled. If done by a reputable company, refilling won't hurt your printer and will provide printouts that are just as good as you get from new cartridges (in fact, the image is often quite a bit darker).

Recycling cartridges keeps them out of landfills and saves the environment from having to come up with whatever it takes to manufacture new ones (except for the toner). If you don't want to recycle your cartridges, at least sell the empties to a refiller (most will buy them from you). *[Apple not only has a cartridge recycling program, they'll donate $1 to a conservation charity for each empty cartridge you return to them.—RS]*

In general, cartridges shouldn't be refilled more than three times, and most companies mark them so they can discard them after the third refill. I'd guess my refills give me about 90% of the life of new cartridges, for about 35%–50% of the price (including replacing the wand that keeps the rollers clean).

There are many companies that refill cartridges, and some have toll-free numbers. If they're in your local area, they'll usually pick up and deliver for free; if they're not, they'll usually split the shipping with you (you pay to send the cartridge, they pay to return it). If you have a problem with a refilled cartridge, any reputable refiller will replace it free of charge. I've had good experiences with the Laser Factory (800 359 5777).

throwing out LWI toner cartridges (AN)

Here's yet another reason to refill LaserWriter I toner cartridges: if you take a used one out of a laser printer and toss it immediately into a plastic waste basket (as I have), you may end up with a melted waste basket (as I have). Those suckers are hot when they come out of the

machine. So unless you want your waste baskets to look like not-very-inspired modern art, let the toner cartridge cool down before throwing it away (or, better yet, refill it).

Service bureau tips

using service bureaus *(AN/David Van Ness)*

There are thousands of businesses called *service bureaus* (particularly in big cities and near universities) that let you come in with your Mac disk and print it out on one or more kinds of PostScript printer and imagesetter. Renting time can be surprisingly inexpensive, as little as about $6 an hour and 30¢ a page.

If you can't find a service bureau in the phone book, check with a local Mac user group (in fact, do that first; unlike the Yellow Pages, they can tell you which businesses know what they're doing, charge the least and so on). If there's no user group in your area, check out the Mac and desktop publishing magazines (some of the former are listed in Chapter 20 and some of the latter in Chapter 14); they sometimes run updated lists of service bureaus to which you can send your files by modem or overnight letter.

Before you do business with a service bureau, make sure you know what they need from you and in what form they can accept files. Confirm that they have the application and *exactly* the fonts you plan to use.

If you plan to send compressed files (by modem or by mail), find out which compression utility to use; if they don't have one you own, you'll need to compress files in self-extracting form.

If it's a company you've never tried before, and it's a big job, send a test page or two so any problems surface before the schedule becomes frantic.

If they have more than one type of laser printer and/or imagesetter, make sure you know the rate for the one you want to use.

preparing for a rented laser printer *(DC/JK/RS/AN)*

When you plan to rent time on a PostScript laser printer, it makes sense to format your documents and set up your disks as completely as possible ahead of time, to cut down on the amount of time you have to pay for. The first step is to make sure that the disk you bring with you has the software you need on it; the service bureau will obviously have some software but they may not have what you used to create your document (or the same version of it).

If you've printed drafts on a non-PostScript printer, be sure the fonts in your document are the ones you want to print on the PostScript laser printer. Call beforehand to make sure they have the outline fonts you want to use installed on their system; if not, be sure you bring both the screen and printer versions of those fonts.

Find out if they're using ATM on the machine you'll be printing from. If they are and you're not, have them turn it off when you run your print job. If they're not and you are, you may want to reformat your document with ATM off before leaving home (or bring ATM with you to install on their machine).

On your own machine, open the Chooser and select the LaserWriter icon (or whatever printer driver icon corresponds to the laser printer you're going to be using). Select *Page Setup...* from the File menu, make any changes you want (or no changes) and click *OK*. Now go through your document. Remember that different printers use different margins from the LaserWriter, and there are other incompatibilities, so you may need to make some changes.

There are, unfortunately, a couple of other possible hangups—font ID conflicts (discussed in Chapter 6) and

viruses, which are very common at service bureaus. Bring a copy of Disinfectant (or some other anti-virus program) on a *locked* floppy and disinfect the Mac at the service bureau before you do anything else there. (Actually, all the disks you bring to a service bureau should be locked.)

preparing for an imagesetter *(David Van Ness/JK/AN/DC)*

mostly for power users

Some people don't get the results they expect when they send documents to a service bureau for output on an imagesetter. Most of the tips in the previous two entries apply to renting imagesetters as well as laser printers, but here are a few specific ones.

First of all, proof your work on a PostScript laser printer first. There may be some differences between its output and the imagesetter's, even if the imagesetter uses the laser printer's drive, but they'll generally be fairly negligible. (The resolution will, of course be higher on the imagesetter—that's why you're using it for the final output—but the position of all the elements and the overall look of the page will be the same.)

There are two exceptions to that rule. First of all, the Linotronic and most other imagesetters can print all the way to the edges of the roll of paper it's using (which can be either 8.5" or 11" wide) while most laser printers can't print wider than 8". Secondly, the Linotronic won't smooth bit-mapped images. If you want the images smoothed, print them out on a LaserWriter and then paste them manually over the equivalent unsmoothed images in the Linotronic output.

Always send all the screen fonts you used along with the file; don't assume the service bureau has the same versions. (This is especially important if you've used a program like Fontographer to edit the characters.) List all the fonts used (in graphics as well as text), along with their publishers and

version numbers (if any). If you've done custom kerning in Quark 3.0 or earlier, also send the XPress Data file (this information is stored with the file in 3.1).

To keep the file size down, delete any extraneous art from the pasteboard margins. Similarly, check illustrations for undefined colors or unnecessary placed art by choosing the *Select All* command, Shift-clicking to deselect everything you recognize and then investigating any remaining handles.

If your job has color separations, find out from the company that's going to print the job how much color *trapping* they need (that's making darker colors overprint lighter colors by a certain distance, to avoid unsightly gaps where they meet). If there's spot color, make sure the PMS numbers are specified.

If there are separate TIFF or EPS files, be sure to include them all. Organize your files so the stranger on the receiving end is less likely to be confused; for example, put art files in the same folder as the page layout files that include them. Label the disk or cartridge with the job name, file name and the application (and version number) that created the files. Include your phone number(s) and be specific about when they should call with questions—do you really want them to call during the night shift?

Most service bureaus have a form where you list which files to print, which pages, page size, whether or not to include crop marks or registration marks, what kind of output (paper or film), whether to make color separations, the number of lines per inch for screens and halftones, the imagesetter resolution and the kind of screening preferred for color continuous-tone images. If you don't have the form, make sure to spell out all these details. Also say how you want the proofs—some people will accept faxed proofs and others won't.

If you're asking for film, confirm how your printer wants it—film positive or negative, right-reading emulsion up or down—and make sure the service bureau understands that. And if you send the file via electronic mail, call to let someone know that it needs to be downloaded.

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Chapter 6

Fonts

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Font basics

what is a font? (AN/EF)

In traditional typesetting, a *font* is a particular typeface in a particular size and a particular style (bold, italic, etc.). On the Mac, however, *font* has come to mean a typeface in every size and every style (what a traditional typesetter calls *a type family).*

For example, Geneva can be scaled to any point size and can be transformed into various type styles (bold, italic and so on; see the entry below on font styles for details). A regular typesetter would consider that many different fonts; to a Mac user, it's all one font—Geneva.

Now that laser printers (and other kinds of digital typesetters) have become more common, there's a move on to bring the two terminologies closer together. In the glossary of one of the LaserWriter manuals, for example, the definition for *font* is followed by one for *font family—a font in various sizes and styles.*

But we think Mac users have gotten too used to their own meaning of the word to be pushed back into line with the old terminology. When you change the size or style of some type, you don't think of it as changing the font. So, throughout this book, *font* is used in the classic Mac sense: a typeface in every size and style.

basic font terms (SA/AN/EF/KF/JK)

- *Monospaced* fonts, like Monaco and Courier, give all characters an equal amount of horizontal space—an *i,* for example, gets as much room on a line as an *M,* even though it may be only 20% as wide. This is a throwback to the days of typewriters, when the carriage moved a fixed distance after each character was typed, but it can still be useful—for example, monospaced fonts let you set the size of a field in a database to consistently show

mostly for beginners

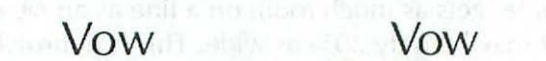
a certain maximum number of characters, whatever the characters may be.

- *Proportional spacing* gives characters different amounts of horizontal space, depending on their actual widths.
- *Baseline, cap height, ascender, descender* and *x-height* are easier to show than describe:

- *Leading* (pronounced *LEDD-ing)* is also called *line spacing*—it's the distance from the baseline of one line of text to the baseline of the next. (In typesetting, it's actually the *extra* distance added to the spacing, but that meaning is dying out, and *leading* is coming to mean exactly the same thing as *line spacing.)*

gossip/ trivia

- Both leading and the size of a font are measured in *points* (both on the Mac and in regular typesetting). Points are 72nds of an inch. (Actually, to be more precise, a point is .0138" and a 72nd of an inch rounds to .01389". But since the difference between them is less than one ten-thousandth of an inch, the distinction is...well...pointless.)
- *Kerning* is adjusting the horizontal space between letters. Normally, each letter lives in its own little rectangle and letters on either side of it don't encroach on its space. But type is easier to read, and looks better, when certain letter combinations nestle into each other—like a lowercase vowel tucked under the overhang of a capital T, or the letters in the following illustration:

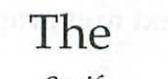


Normal spacing *Kerned*

- Some fonts contain *kerned pairs*—built-in kerning between certain pairs of letters *(Ta, To, Tr, We,* etc.). But kerned pairs work only if the program you're using

supports them (most word processors don't, but most page-layout programs do). You don't have to worry about kerned pairs—you just type as usual and the software substitutes the kerned pairs for the plain pair you typed.

- *Serif* fonts have serifs—little hooks, lines or blobs—added to the basic form of their characters; *sans serif* fonts have none *(sans* is French for *without).*



Serif *Sans serif*

❦ *bit-mapped, outline, screen and printer fonts*

(AN/JK/EF)

mostly for beginners

When the Mac was first introduced, fonts came only in one format: *bit-mapped.* Each character in a bit-mapped font is made up of a pattern (or map) of dots; each of these dots is represented by a *bit* in the computer's memory. Because of this one-to-one correspondence, the Mac needs a different bit-map for each font size you display on the screen (so Apple calls them *fixed-size* fonts). If you use a size that isn't installed, the Mac rescales the bit-map from a size that is installed—with mixed results (see *bit-mapped font sizes* below).

There are 72 dots per inch in the characters that make up a bit-mapped font—or, to put it a different way, they have a *resolution* of 72 dpi. (It's no coincidence that the standard Mac screen also has a resolution of 72 dpi.) You get several bit-mapped fonts with the system software, including Chicago and Geneva, but most of these come as outline fonts too.

The characters in *outline* fonts aren't made up of dots—they're composed of instructions for forming an outline of each character, which is then filled in. This means they can be scaled to any size, and look smoother and crisper than bit-mapped fonts.

When you send an outline font to a laser printer or an *imagesetter* (a digital typesetting machine that can also

handle graphics), the printer draws the characters in as much detail—at as high a resolution—as it's capable of. (For some comparative printer resolutions, see the second entry in Chapter 5.)

Most outline fonts come in one or both of two formats: PostScript or TrueType. PostScript is more than just a font format—it's a programming language specifically designed by its developer, Adobe, to handle text and graphics and their placement on a page.

At this writing, the Mac's system software can't display PostScript fonts on the screen, so they come in two parts: the actual outline font, which gets sent to the printer (and is therefore called the *printer font)* and a bit-mapped version to represent it on the screen, called the *screen font.* Sending a printer font to a printer is called *downloading* it, and that gives us another name for this kind of font—*downloadable.*

Not all printers are designed to handle PostScript fonts—only those with PostScript, or some emulation of it, built in (at this point, that includes most laser printers, but virtually no inkjets or dot-matrix printers). To address this problem, you need ATM (Adobe Type Manager), a utility that interprets PostScript printer fonts for the screen and for non-PostScript printers.

(ATM only works with Type 1 PostScript fonts, however, not Type 3. For more about them, see the next entry. ATM is covered in the *Font utilities* section later on in this chapter.)

Like any bit-mapped font, a screen font will print out if the printer font isn't there, but it won't look a whole lot like the actual outline font does—both because of the lower resolution and because the person who designed the screen font knew it was only going to be used as an approximation of the font on the screen, and therefore probably didn't spend a lot of time fine-tuning it for printing.

TrueType fonts don't require separate screen and printer fonts—TrueType support is built into System 7, so the same font works both for displaying and printing. (TrueType capability can also be added to System 6.0.7 using a special installer available from Apple dealers.) You get nine TrueType fonts with System 7, and many others are available, but PostScript fonts have been around a lot longer, so there are a lot more of them.

There are other outline font formats too—the DeskWriter printer comes with fonts in Hewlett-Packard's own format, for example—but they're usually very limited in the variety of fonts available and the number of printers they'll work on.

For more information on the differences between PostScript and non-PostScript printers, see the entry titled *PostScript vs. non-PostScript* in Chapter 5.

✎ *Type 1 and Type 3 PostScript fonts* (SA/EF/JK)

There are two standards for PostScript fonts—*Type 1* and *Type 3* (Type 2 was a dead-end technology that Adobe dropped). Type 1 fonts contain special information called *hinting* that helps small sizes of type print well at the 300-dpi resolution of most laser printers.

In the past, only Adobe and companies that licensed its font-creation tools offered Type 1 fonts. Type 3 was the standard for non-Adobe fonts, but since they didn't have hinting, they didn't look as crisp as Type 1 fonts when printed, especially at less than 9 points or so.

Today it's easy to create Type 1 fonts with font design programs like Fontographer and FontStudio, and the only fonts you're likely to find in Type 3 format are ones made up of very complex graphics or that include shading (Type 1 only supports black-and-white and can't handle too many crossed paths and curlicues).

Don't worry about Type 1 versus Type 3 if you're printing at a higher resolution than 300 dpi, or if you never

use type below 9 points. The only other time it will make a difference is if you're using a program that works with only one kind of font or the other—Adobe Type Manager, for example, only works with Type 1 fonts.

You can convert Type 3 fonts to Type 1, or vice versa, with programs like FontMonger and Metamorphosis Professional (described in the *Font utilities* section below).

how the Mac chooses fonts *(JK)*

Some fonts come in all of the formats discussed above. But even if you install a font in several different formats, its name still only appears once on font menus. (You need to have either a bit-mapped or a TrueType font installed for its name to show up at all.)

For example, Times comes in bit-mapped, TrueType and PostScript versions; if they're all installed and you select *Times* from a font menu, how does the Mac decide which version to use?

For screen display, the Mac selects fonts in the following order:

1. the bit-mapped font (if it's installed in the specified size)
2. the TrueType font
3. the PostScript font (if ATM is installed)
4. a scaled version of the bit-mapped font in another size

The Mac is wise to choose the bit map first, if the correct size is installed; in some fonts, it looks smoother onscreen than the TrueType version.

For printing, the Mac selects fonts in a different order. On PostScript printers, it looks for the PostScript font in:

1. the printer's ROM (where built-in fonts are kept)
2. the printer's RAM (which temporarily stores downloaded fonts)
3. the printer's hard disk (where permanently downloaded fonts are kept)
4. the Mac's Extensions folder or System Folder

If it doesn't find a PostScript font in any of those places, or if a non-PostScript printer is chosen, it looks for:

1. the TrueType font (on the Mac)
2. the PostScript font as scaled by ATM
3. the bit-mapped font, to be scaled if necessary

suitcase files *(JK)*

Bit-mapped and TrueType fonts need to be stored in special files called *suitcases*. A suitcase works like a folder, but instead of containing regular files, it contains fonts and/or sounds (under System 6, suitcases can also contain DA's). When you double-click a suitcase file (in System 7), a window opens showing all the fonts and sounds it contains, and you can remove them or add more by dragging their icons into or out of the window.

[It's been my experience that when you try this in System 7 on suitcases created in System 6, you almost invariably get the message that the suitcases can't be opened because they're "damaged." I've tried clicking v-e-r-y, v-e-r-r-y gently, so as not to damage them, but that doesn't seem to help, so I guess it must be a bug.—AN].

You can distinguish suitcase files by their icons, which look suspiciously like—oh, I get it!

[Like all of us, John loves being a Mac Bible editor and wearing the special Mac Bible editor badge and using the secret decoder ring. The down side is when I put jokes in his mouth that make him sound like an idiot, as I just did. Still, it's a small price to pay for having crazed Mac Bible fans tear your clothes off whenever you appear in public.—AN]

The Kind column in list views will also tell you which files are suitcases. Interestingly, the System file itself is a suitcase file:

Suitcases are commonly used for assembling sets of similar fonts (you can create your own suitcases with Font/DA Mover, and make them active with programs like Suitcase or MasterJuggler). Then, when you need the fonts in a particular suitcase, you can install them all together, instead of having to find each individual one.

❦ *recognizing TrueType fonts* (CR/JK)

Both bit-mapped and TrueType versions of the same font can be stored in the same suitcase file, so how do you know which is which? There are two easy ways to tell. First, the TrueType font names don't have a size number after them, and bit-mapped fonts always do. Second, TrueType font icons show the letter *A* in three sizes (in icon views), while bit-mapped font icons just show a single *A*:

True Type font

Bit-mapped font

❦ *font styles* (AN/EF)

On the screen, every font can be made bold, italic, outline, shadow and any combination thereof—sixteen possible variations in all: bold italic, bold outline, bold shadow, italic outline, italic shadow, outline shadow, bold italic outline, bold italic shadow, bold outline shadow, italic outline shadow, bold italic outline shadow and, of course, plain (which is called *Roman* in regular typesetting).

Some of these combinations may seem foolish to you, but it's not just a case of meaningless overkill—quite often one variation will have just the look you want and

no other variation will be quite right. And you'll find that in another font, that particular variation will look terrible and a different one will be just right. (For an easy way to see them all, see the entry on font templates below.)

With PostScript fonts on paper, you don't get all sixteen combinations; for example, it's common for outline shadow to look just the same as shadow. How many variations you get depends on the font, the application and/or the printer.

There's an important distinction to be aware of when thinking about outline fonts. Sometimes italic and boldface type styles are separately designed by a human being; these are called *cuttings* (from the days when type was designed by carving blocks of wood). Other times, the computer *algorithmically* derives the type style—that is, it applies a formula like *increase the width 20%* (to create boldface) or *slant right 12°* (to create italic). This doesn't always look as good, but it's better than nothing. (Type that's slanted algorithmically is usually called *oblique* rather than *italic.)*

bit-mapped font sizes

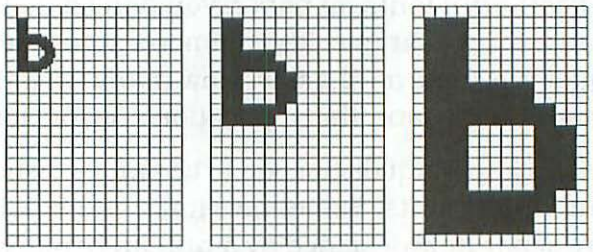
(AN/SA/EF/JK/Paulann Thurmon/Hal Lewis)

mostly for beginners

Bit-mapped fonts come supplied in various sizes and, unless you've got a TrueType or PostScript version of the same font, they should be used only in the sizes you have installed, or in halves or quarters of those sizes. *Scaling*—shrinking or enlarging—a bit-mapped font can result in some pretty horrendous characters, both on the screen and in printouts.

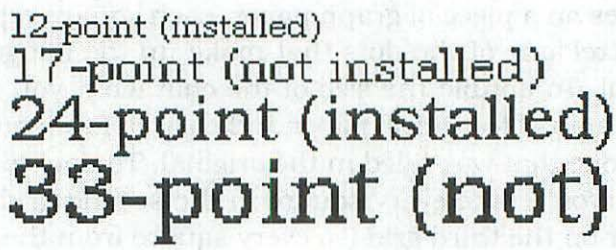
Picture a bit-mapped character as a series of filled-in squares on a piece of graph paper; each square represents one *pixel* (one of the dots that make up the image on the screen). To double the size of the character, you'd take a larger area of the graph paper and color in four squares for every one that was filled in the original. To double the size again, you'd take every square in the second grid and fill in four on the third grid (so every square from the original grid is now represented by *sixteen* squares on the third grid).

The illustration below shows the letter *b* being enlarged on just such a grid. (The smallest letter is actually using a grid that's half the size of the one shown—including all those lines in the illustration made the shape of the letter hard to see.)

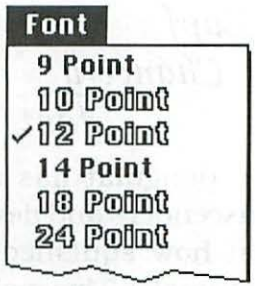


You can see that what was an acceptable curve in the small letter gets worse with each size increase, producing the dread *jaggies* (staircasing like that on the right side of the rightmost *b* above).

Scaling to a size that's not double, quadruple, half or a quarter the size of the original creates even more jaggies. It's not so bad if you're tripling the size, since each original square can translate into nine new filled squares, but let's say you're going from 12-point to 30-point (2.5 times bigger). You can't use half-squares (since each square on the grid represents a single pixel on the screen, and pixels are the smallest unit the screen can display). So each original filled square will sometimes get replaced by four squares (twice the original size) and sometimes by nine squares (three times the original size). This produces the messes like the 17-point and 33-point type shown below:



The installed sizes of bit-mapped fonts (including screen fonts) are shown in outline type on the font size menu (which is sometimes part of another menu), as shown on the right. (If you're using TrueType fonts, every size in your font menu will be shown in outline type, because they scale smoothly to any size.)



On pop-up menus inside dialog boxes, no font sizes are outlined but only the installed sizes are listed at all, unless a TrueType version of the same font is installed. (There's usually a text box where you can type in uninstalled sizes.)

The standard type sizes that most applications give you on the font size menu are 9-, 10-, 12-, 14-, 18- and 24-point. Many applications (including all high-end word processors and page-layout programs) let you type in any other size you want—even, sometimes, fractional sizes like 10.5 points.

why font sizes aren't *(AN/SA)*

Font sizes don't measure the actual height of the characters, but rather the distance from one baseline to the next. (See *basic font terms* above, if you don't understand any of the terms in this entry.) Fonts that are nominally the same size often vary quite a bit in actual size. For example,

very hot tip

this is 18-point Zapf Chancery,

but this is 18-point Benguiat.

The letters in Zapf Chancery are smaller in order to leave room for the font's exuberant ascenders and descenders (that's usually why fonts appear small for their size). If the letters were bigger, the ascenders and descenders would hit each other; as it is, they just barely clear each other (unless you add extra leading):

Zapf Chancery font

Benguiat has a high *x-height*, which means that its ascenders and descenders are proportionally smaller (look at how squished-down the descender on the *g* is, for example). This makes the type itself bigger for a given (baseline-to-baseline) type size. So here are the basic rules:

- The higher the x-height, the shorter the ascenders and descenders, and the bigger a font looks at a given size.
- The longer the ascenders and descenders, the lower the x-height, and the smaller a font looks at a given size.

tiny fonts *(AN/SA/JK)*

Remember that the smaller the type size, the more the resolution of the printer matters. (At any given resolution, it's obviously easier to form a nice-looking 12-point character than a 6-point one, because you have more dots to work with.)

Well-designed 9-point fonts work fine on dot-matrix printers, and specially designed 8-point fonts can also be quite readable. On 300-to-360-dpi inkjet and laser printers, 6-point and 7-point fonts are quite readable (depending on the font) and even some 5-point type is legible. For smaller sizes than that, you'll need an imagesetter, or a high-resolution laser printer.

font weights *(AN)*

There are many levels of boldness (how thick each character is). Here are some common names for the various levels, from lightest to heaviest:

- ultra light
- extra light, or thin
- light

- Roman, book, regular, plain, normal or no adjective (just the name of the font)
- medium
- demi
- bold
- extra bold, heavy or black
- ultra bold

special type styles *(AN/EF)*

Some fonts offer type styles far beyond the standard sixteen (only on the Mac could you call *bold italic outline shadow* "standard"). In addition to all the different levels of boldness just mentioned, there are *condensed* fonts (letters squeezed together and stretched vertically) and *expanded* fonts (letters spread apart and stretched horizontally). To get special type styles like condensed and expanded, you usually have to install the corresponding screen fonts, since only a few programs (Nisus, PageMaker, Quark and FreeHand, for example) offer these styles as menu items.

renaming fonts *(SA/EF)*

Screen fonts can be renamed in programs like Fontographer or Fontastic, or in ResEdit. You might want to do this if there's a particular font you want at the top of the menu for quicker access, or if you find the regular font name hard to remember. If you rename the screen font, the right printer font will still be found. If you rename a printer font, however, it won't be found, and you'll get a crummy, bit-mapped printout.

printer font file names *(AN/SA)*

There is some method to the seeming madness of printer font file names. The first five letters are the first five letters of the font name; the rest of the letters, usually in groups of three, describe the style or further specify the

font. So, for example, the printer font file for Bitstream's Berkeley Old Style Black Italic is named *BerkeOldStyBlaIt*. Here are some of the common style codes used:

bd	bold	*lig*	light
boo	book	*lit*	lite
bla	black	*med*	medium
bol	bold	*nor*	normal
con	condensed	*obl*	oblique
dem	demi	*reg*	regular
ext	extra, or extended	*rom*	Roman
hea	heavy	*sem*	semi
it	italic	*thi*	thin
ita	italic	*tit*	titling
kur	kursiv	*ult*	ultra

font menu shorthand *(SA/EF/AN)*

Some fonts appear in your menu with cryptic letters in front of them. (For the reason behind this, inadequate though it is, see the entry called *font families on menus* in the section below on font problems.) The initials are the modifiers of the main font name. Here are the ones you're likely to see, and what they stand for:

B	bold	*L*	light
Bk	book	*N*	narrow
Blk	black	*O*	oblique
C	condensed	*P*	poster
D	demi	*S*	semi
E	extended	*Sl*	slanted
H	heavy	*U*	ultra
I	italic	*X*	extra
K	kursiv		

Sometimes you'll see them in combination—*XBO*, for example, stands for *extra bold oblique*.

A font utility called Adobe Type Reunion lets you list different styles and weights in a submenu under the

font's name, but this makes it impossible to access them with macros. In some applications, you can display font names in the font itself; Goudy Bold Italic, for example, appears on the menu as a bold, italic version of Goudy. You can also get this kind of font menu with utilities like Suitcase and MasterJuggler (described in Chapter 7) and MenuFonts (described in the *Font utilities* section of this chapter). It's nice if you don't know your fonts very well, but if you do, it slows things down annoyingly to view them this way.

picking fonts *(AN/EF)*

Which fonts to use is a matter of personal taste, of course, but there are a couple of general principles that will help you do it efficiently. The first rule is that it takes a while to learn which fonts you like, so spend some time playing with them before making your choices.

Second (and this may also be obvious), be aware that different kinds of jobs require different fonts. You might choose one group of fonts to use for your business letters, another for your personal letters, a third for your erotic poetry, and so on.

Fonts can be divided into three basic categories: text, display and decorative. The boundaries between the categories aren't hard and fast, but here are a few guidelines:

- *Text* fonts are designed primarily to be used in sizes up to about 14 point, for...you guessed it...text. Designers usually stick to conservative fonts for text; a font that's too flamboyant can be hard to read.
- *Display* fonts are designed primarily to be used in sizes above 14 point or so, in headlines, titles and the like. They're usually bold and eye-catching, but readable and not too ornate.
- *Decorative* fonts come in almost any style you can imagine (and some you can't). They're used as attention grabbers, decorative elements or just for fun.

You'll find samples of all three types of fonts later on in this chapter.

a template for viewing fonts *(AN/SA)*

Although most font publishers give you full printouts of their fonts, it makes sense to create a template like the one below to evaluate fonts that don't have a printout. Once you've set it up—which might take twenty minutes—all you have to do is select the entire template and then change the font in order to get a printout of every character a given font can produce, as well as samples of the sixteen possible type styles in that font.

It doesn't matter which font you choose to make the original template, since you're going to be changing it when you use the template anyway. We've picked the one this book is set in.

font: Bookman from: Adobe

9 point: 1234567890
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

10 point: 1234567890
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

12 point: 1234567890
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

14 point: 1234567890
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

18 point: 1234567890
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVW

24 point: 1234567890
abcdefghijklmnopqrstu
ABCDEFGHIJKLMNOPQR

unshifted symbols: ‘ - = [ ] \ ; ’ , . /
shifted symbols: ~ ! @ # $ % ^ & * ( ) _ + { } | : “ < > ?
option keys:
‘ ¡ ™ £ ¢ ∞ § ¶ • ª º – ≠
œ ∑ ´ ® † ¥ ¨ ^ ø π “ ‘ «
å ß ∂ ƒ © ˙ ∆ ˚ ¬ … æ
Ω ≈ ç √ ∫ ~ µ ≤ ≥ ÷
shift-option keys:
Ÿ ⁄ ¤ ‹ › fi fl ‡ ° · ‚ — ±
Œ „ ‰ Â Ê Á Ë È Ø ∏ ” ’ »
Å Í Î Ï Ì Ó Ô Ò Ú Æ
Û Ù Ç ◊ ı ˆ ˜ ¯ ˘ ¿
accent characters:
Á á É é Í í Ó ó Ú ú
À à È è Ì ì Ò ò Ù ù
Â â Ê ê Î î Ô ô Û û
Ä ä Ë ë Ï ï Ö ö Ü ü Ÿ ÿ
Ã ã Õ õ Ñ ñ

This is bold. *This is italic.* Outline. Shadow. ***Bold italic.*** Bold outline. **Bold shadow.** *Italic outline.* *Italic shadow.* **Outline shadow.** ***Bold italic outline.*** ***Bold italic shadow.*** **Bold outline shadow.** ***Italic outline shadow.*** ***Bold italic outline shadow.***

Here are some pointers on how to set this template up for yourself. You might as well begin by just typing ours; then you can customize it any way you want.

The shifted and unshifted symbols are shown in rows, the same way they appear on most keyboards, from left to right and top to bottom. Because the characters produced by the Option key (with and without the Shift key) don't appear on the keyboard, this makes it easy to find the symbol on the keyboard.

Although all fifteen type styles are shown at the bottom of the template (plain text is omitted because most of the rest of the template is in it), it makes sense to give yourself a bit more of a look at the three most useful ones: **bold,** *italic* and ***bold italic.*** So we've put the title (font and publisher) in bold italic, the type sizes in italic, and the subheads below the type sizes (unshifted symbols, shifted symbols, etc.) in bold. We've also underlined those subheads and the type sizes, so you can see how underlining looks with the font.

When you type the template in yourself, you may want to make the special characters or the style variations bigger, so you can see them better; with most fonts, the whole template will still fit on a page. Each time you select the template and change it to a different font, you may have to readjust line breaks and even lop a few letters off some of the larger alphabets. That's because, as explained above, fonts of the same nominal point size vary quite a bit in actual size, both in height and width.

When using the template for a bit-mapped font, it makes sense to only show the sizes that are installed, because scaled sizes of bit-mapped fonts generally look wretched. For outline fonts, you can use all the sizes in the template, and even add more if you want.

Like Bookman in the sample template above, most outline fonts have special characters for every possible slot. Bit-mapped fonts almost never do. When a font doesn't have a given special character, it will produce the *missing character box:* □ (its appearance varies with the

font, but it usually looks pretty much like that). But the missing character box will only print on dot-matrix printers, not on laser printers (on inkjets, you get other weird characters).

AFM files *(SA/Alan Winslow)*

AFM *(Adobe Font Metrics)* files are supplied with many PostScript printer fonts. For the most part, you can just ignore them. If an application needs them (it's rare), the documentation will tell you so, and it will also tell you where to store them (usually in the System Folder). You can also use AFM files to find out the exact dimensions of the characters in a particular PostScript font. They're text files you can read with any word processor.

mostly for power users

The Macintosh Font Book *(AN)*

Font maniacs like myself always like good books on Macintosh fonts, and *The Macintosh Font Book* by Erfert Fenton (Peachpit Press) is the best I've seen (Erfert also contributed to this book). It's full of useful information and is clearly and engagingly written.

very good feature

There are lots of illustrations, a glossary and several helpful appendices. The book costs $24, but if you use Mac fonts frequently, want to develop a good grasp of typographic principles or just have a thing about fonts, I think you'll find it a good investment.

Special characters

the standard special characters *(AN/SA/JK)*

There are some characters on computer keyboards you won't find on typewriter keyboards—the backslash (\ ), the vertical bar (|), the lesser than and greater than signs (< >) and so on. But when people talk about special characters on the Mac, they mean ones that aren't shown on

mostly for beginners

the keyboard at all. To get one of these special characters, you hold down the Option key (with or without the Shift key) while pressing another key.

Let's say you want to type: *Hein, salopard! Parlez-vous français?* To get the special character ç in *français*, you hold down Option while hitting C. To get certain other special characters, you have to hold down the Shift key as well. For example, if you hit Shift Option C you get an uppercase Ç instead of a lowercase one. (In this case, the two characters are related, but sometimes the Option and Shift Option characters have nothing to do with each other.)

Some fonts have idiosyncratic special characters of their own, but there's a set of standard special characters that virtually all fonts share. No bit-mapped font contains all of them—Geneva and Chicago seem to have the most—but most outline fonts have the full set. The diagrams below show where they appear on the keyboard under System 7 (some of them are different under System 6 and earlier versions; for details, see the entry below called *keystroke changes under System 7*). The next entry shows them by category.

Standard Option characters

Standard Shift Option characters

the standard special characters by category

(AN/EF/JK/SA/KF/Paulann Thurmon)

Some special characters do double duty; for example, the square root sign can serve as a check mark. When a character has more than one function, we list it under each category where it can be used. (Here again, we show the key combinations that produce them under System 7; some of them are different under System 6 and earlier versions, and some special characters are only available under System 7 (see the entry below called *keystroke changes under System 7).*

accent marks for foreign languages

Two foreign accent marks (also known as *diacritical marks*, or *diacritics)* are regular characters on the Mac's keyboard, marked right on the keys—the tilde (~), and the accent grave (`). But it's not clear what you're supposed to use them for, since if you just press one of those keys, the character always appears on a space of its own, not above another character.

The accent marks in the table below work the way they should—when you hit the key combination shown in the last column, nothing shows up on the screen, but when you type the next character, it appears with the appropriate accent mark above it. So, for example, typing Option E does nothing, but typing an E after it produces *é*.

´	acute accent; accent aigu	Option E	{á é í ó ú Á É Í Ó Ú}
`	grave accent; accent grave	Option `	{à è ì ò ù À È Ì Ò Ù}
^	circumflex; circonflexe	Option I	{â ê î ô û Â Ê Î Ô Û}
¨	dieresis; umlaut	Option U	{ä ë ï ö ü ÿ Ä Ë Ï Ö Ü Ÿ}
~	tilde	Option N	{ã ñ õ Ã Ñ Õ}

These accent marks won't appear over just any letter you type—it has to be one the Mac thinks makes sense. If you try to put an accent over a different letter, the

accent appears by itself on one space and the letter on the next—like this: ´R. The fourth column in the table above shows the letters you can put each accent mark over. (If you *want* an accent to appear over a blank space, just hit the appropriate key combination, then the space bar.)

You can also get certain accented capital letters with a single key combination:

Á	Shift Option A	Â	Shift Option M
Á	Shift Option Y	Î	Shift Option D
Ï	Shift Option F	Í	Shift Option S
Ó	Shift Option H	Ó	Shift Option J
Ó	Shift Option L	Ú	Shift Option ;

The Mac can also produce some less common diacritical marks, but since they show up on spaces of their own, they're only useful in programs that will have some way of letting you place two characters in the same space. Anyway, here they are:

˙	dot accent	Option H	
ˇ	Carib diacritic	Shift Option .	(System 7 only)
˝	Hungarian umlaut	Shift Option G	(System 7 only)
¸	cedilla	Shift Option Z	(System 7 only)
˛	Ogonek diacritic	Shift Option X	(System 7 only)

In System 6, you can only produce the last four characters in utilities and applications (like Word) that let you enter a character by its ASCII code. Here are the codes to use:

cedilla	252
Hungarian umlaut	253
Ogonek diacritic	254
Carib diacritic	255

In pictorial and symbolic fonts, other characters are assigned to those keystrokes (see the next section).

foreign letters, letter combinations & abbreviations

å	Option A	Å	Shift Option A
æ	Option '	Æ	Shift Option '
ç	Option C	Ç	Shift Option C
ø	Option O	Ø	Shift Option O
œ	Option Q	Œ	Shift Option Q
ª	Option 9	º	Option 0
ß	Option S		

foreign punctuation marks

¿	begins questions in Spanish	Shift Option ? /
¡	begins exclamations in Spanish	Option ! 1
«	European open quote mark	Option \
»	European close quote mark	Shift Option \

These last two symbols are called *guillemets (gee-may).*

monetary symbols

£	pound sign	Option 3
¥	yen sign	Option Y
¢	cent sign	Option 4

legal symbols

§	section mark	Option 6
¶	paragraph mark	Option 7
™	trademark	Option 2

® registered mark Option R

© copyright symbol Option G

well-known mathematical & scientific symbols

— minus sign Option -

÷ division sign Option /

√ square root Option V

∞ infinity sign Option 5

π pi Option P

° degrees Shift Option 8

not-so-well-known mathematical & scientific symbols

Since some of the symbols below can represent about a dozen different things, depending on the field of study, we simply give you their Greek names and/or what they most commonly stand for.

≠ not equal to Option =

≈ more or less equal to Option X

≤ less than or equal to Option ,

≥ greater than or equal to Option .

« much less than Option \

» much greater than Shift Option \

± plus or minus Shift Option =

Å Angstroms Shift Option A

∂ delta; differential, variation Option D

Δ capital delta; increment Option J

μ lowercase mu; micro- Option M

Ω capital omega; ohms Option Z

f	function, f-stop	Option F
∑	capital sigma; sum	Option W
∫	integral	Option B
∏	capital pi; product	Shift Option P
¬	logical not	Option L

typographic, graphic & miscellaneous symbols

"	double open quote	Option [
"	double close quote	Shift Option [
'	single open quote	Option]
'	single close quote	Shift Option]
–	en dash	Option -
—	em dash	Shift Option -
√	check mark	Option V
◊	diamond	Shift Option V
†	dagger	Option T
•	bullet, for lists	Option 8
...	ellipsis	Option ;
	Apple symbol	Shift Option K
¤	currency	Shift Option 2

keystroke changes under System 7 *(EF)*

Just when you thought you were getting the hang of typing keystroke combinations to produce special characters, System 7 comes along and changes the rules. The table on the next page shows characters that you get with one key combination under System 6 and another under System 7.

LOOKS LIKE THIS (assuming you capitalize the first letter of each word). The problem with this approach is that the regular caps look heavier than the small caps. To get around that problem, some fonts are specifically designed for small caps. Often they're included in expert sets (see the next entry).

expert sets *(EF)*

Expert sets, or *expert collections* (available, as of this writing, from Adobe, Linotype and Monotype) are extended versions of fonts that provide special characters like small caps, fractions, old-style numbers (that dip below the line) and ornate letters. (Unfortunately, they only exist for a handful of fonts.)

One popular expert set was designed by Adobe for its Utopia font (the expert set lists for $185). This is how regular Utopia looks. THESE ARE SMALL CAPS FROM THE EXPERT COLLECTION, AND HERE ARE A FEW FRACTIONS FROM THE EXPERT COLLECTION: ¼ ½ ¾ ⅛ ⅜.

If you can't find an expert set in your favorite font, utilities like FontMonger or ParaFont let you create small caps and other special characters from a regular font file at the click of a button (see the *Font utilities* section of this chapter). Of course, since you're simply telling the computer to alter the existing font's characters, the result won't begin to match the look of a small caps face handcrafted by a professional type designer.

creating special typographic effects *(AN)*

To distort a headline or other piece of display type for special effect, type it first in any draw program (but not a paint program; you need object-oriented graphics). Then paste it into a word processor or page-layout program, either through the Clipboard or the Scrapbook. (You can actually do the whole process in Word. To find out how, see the entry called *the graphics dump* in the Word tips section of Chapter 9.)

Once it's there, select it and reshape it to stretch the type horizontally, vertically or both. It will look terrible on the screen but when you print it out on an inkjet or laser printer, the characters will have the same crisp, clean edges that outline fonts normally do. (If you're using a PostScript font, you'll need ATM to get good quality from non-PostScript printers.) Here are some examples of the kinds of effects you can get:

(The fonts being distorted are Adobe's Cooper Black italic, Casady & Greene's Kells and their Gazelle.)

If your word processor doesn't let you reverse type—that is, make it white instead of black (usually on a dark background, so you can see it)—you can use a draw program to get it. First create a solid shape filled with black (or gray, or any other pattern you want for the background). Then either drag some outline type on top of it or, with the filled-in shape selected—choose *Outline* from the Style menu and start typing.

You can combine both these techniques, creating white writing on a dark background and stretching it once it gets into your word processing program. These typographic special effects also work on dot-matrix printers, but you don't get smoothing and the results don't look anywhere near as good.

(There are programs available that will give you much fancier effects than these, and much more control over them. They're described in the *Font utilities* section below.)

Symbolic and pictorial fonts

symbols and pictorial characters (AN)

One of the best features of the Macintosh is the availability of useful symbols and pictorial characters—little images you can place in a document with nothing more than a keystroke or two.

The best way to arrange a pictorial or symbolic font for reference is by categories, rather than by the keys that generate the characters. That way you can look for what you want instead of having to scan a whole list or table. Every publisher of a pictorial font ought to provide a printout of it by logical categories, but since they don't, this section gives you some. (These fonts-by-categories are the part of *The Macintosh Bible* that I personally refer to the most.)

They cover three of the most useful pictorial fonts—Zapf Dingbats (a PostScript font that comes with most laser printers), Cairo (an old-standby bit-mapped font from the early days of the Mac) and Carta (a downloadable PostScript font of map-making symbols). Later on in the section, there's also a fourth printout by logical categories; it's of Symbol, a nonpictorial PostScript font that has come with laser printers since the first LaserWriter.

One final note: if a pictorial character (or any other kind of nonstandard special character) uses one of the foreign accent mark keys, you'll have to hit the key twice (or hit it and then hit another) to generate the character (because normally that key waits for you to type a letter to put the accent mark over). So, for example, to get the character

① in Zapf Dingbats, you have to hit Option U (which normally generates an umlaut, ¨) twice; if you just hit it once, nothing will happen.

In general, whenever you have to hit one key (or key combination) and then another, rather than all together, we separate the keys with a comma (e.g. Option U, Shift O).

key-caps fonts *(SA/EF/JK)*

Needless to say, you need a special font to produce key-cap characters like ⌘, Option and Shift (not to mention A, B and C). The second edition of *The Macintosh Bible* used a $90 bit-mapped key-caps font from Dubl-Click called Manhattan (aside from the special characters, it's basically New York—hence the name).

This is Manhattan. It gives you Macintosh symbols like Tab Click Option Enter Drag and ⌘. Manhattan is showing its age, however—it has no Delete key cap (only Backspace) and no key caps for many keys on the extended keyboard.

Hacker is another bit-mapped key-caps font that's part of Casady & Greene's $50 Fluent Fonts set. H A C K E R

l o o k s l i k e t h i s a n d

i n c l u d e s c h a r a c t e r s

l i k e Return Caps Lock Save Copy a n d File .

Page Studio Graphics offers ten key-caps fonts; we're using two for the key caps in this book. The first one—PIXymbolsCommand has the cap letters and most of the special keys. The other font—S2113PIXymbols (yes, that's its name) has lowercase letters (a b c), symbols for the special keys like those used in menus (⌃ ⇧ ⏏) and key caps for certain keys that have two characters on them (1 2 3), just like the keyboard.

Both fonts have a simple, thin line for the key shape, so the characters print nicely on laser printers and inkjets

that use ATM. Variations on the key outline—light or heavy, shadowed, gray, double (sort of three-dimensional)—is what's different about the other PIXymbols fonts. There's even a roll-your-own key font in which you type the left half of the key, the character you want and then the right half of the key.

If the PIXymbols key-caps fonts aren't your cup of tea, two other companies—Casady & Greene and Imprimatur Design Systems—also offer PostScript key-caps fonts.

For more on Page Studio Graphics' other special fonts, see the entry that begins at the bottom of this page.

❦ *Utility City* (SA/EF/JK)

Utility City is a font that's included on Dubl-Click Software's two-disk set of World Class LaserType outline fonts ($90). It's a derived font—that is, it borrows characters from Times, Helvetica, Symbol and Zapf Dingbats to create its own characters, so those four fonts need to be installed in your system or Utility City won't work.

Among its many talents, Utility City gives you true fractions. It lets you combine buttons, boxes and checkmarks, and gives you different angles on some of the Zapf Dingbats:

Symbols Galore (miscellaneous symbols) and Math-Whiz (business and math symbols) come on the same disk with Utility City; they take a similar approach to combining characters from other fonts to create new ones.

❦ *PIXymbols fonts* (AN/JK/EF)

In addition to the key caps fonts covered in the entry above, Page Studio Graphics offers a large number of specialized

pictorial fonts. In general, they're nicely designed and eminently useful, and designer/owner Roger Vershen is constantly improving them. (Unfortunately, many of their fonts have numbers instead of names, which makes it hard to remember what they are.)

Here's a sample of PIXymbolsTravel ($185); designed for the travel and recreation industries, it includes all the standard icons used by the Department of Transportation and the National Park Service:

Other PIXymbols fonts offer Macintosh icons and symbols, international road signs, telephone buttons and images, digital characters and clocks, apothecary measures, braille, astrology and much, much more. There's a $145 collection of eight fraction fonts—four serif, four sans—called Precision Pi. These aren't derived fonts like Utility City in the previous entry —they generate their own characters, rather than steal them from other fonts.

All of Page Graphics Type 1 PostScript fonts include TrueType versions at no extra charge. They also come bundled with a DA that helps you find the characters you need (it's sort of a supercharged Key Caps) and with a limited version of the FontDisplay program described under *Font utilities* below.

Zapf Dingbats by categories *(AN/SA/JK/Paulann Thurmon)*

When Zapf Dingbats is the selected font, all you have to do to generate any of the pictorial characters shown is hit the key(s) indicated. (As indicated below, some characters can only be produced from the keyboard in System 7, and some key combinations are different in System 6 and System 7.)

arrows (fat tails)

Shift Option B

Option ~`, Shift U

Shift Option I

Shift Option <,

Shift Option >.
(Shift Option M in Sys 6)

Option I, Shift U

Shift Option N

arrows (hollow)

Shift Option D

Shift Option F

Option ~`, Shift I

Shift Option H

Option ~`, Shift E

Shift Option S

Shift Option J

Shift Option L

arrows (solid)

Shift Option]1

Option]1

Shift Option $4

Shift Option %5

Shift Option (9

Shift Option ~`

Shift Option !1

Shift Option @2

Option ?/

Shift Option V

Shift Option Y

Shift Option U

Shift Option M
(Shift Option R in Sys 6)

Option I, Shift E

Shift Option Z
(Sys 7 only)

Shift Option G
(Sys 7 only)

arrows (stylized)

→	Option H	↛	Option K
⇢	Shift Option ^ 6	⇢	Shift Option & 7
➢	Shift Option W	➢	Shift Option) 0
➤	Shift Option E	➲	Shift Option : ;
⇛	Shift Option X (Sys 7 only)		

asterisks (florettes, snowflakes, starbursts)

❄	D	❄	E	❄	F
✳	G	✳	H	✻	I
✳	J	✳	K	❀	`
✳	[	✻	]	✳	\
✢	Shift B	✣	Shift C	✤	Shift D
✣	Shift E	✱	Shift Q	✳	Shift R
✳	Shift S	✳	Shift T	✳	Shift U
✶	Shift V	✷	Shift W	✸	Shift X
✸	Shift Y	✺	Shift Z	❀	Shift ^ 6
✿	Shift -				

braces and brackets

❮	Option U, Shift U	❯	Option E, A
(	Option U, Shift A	)	Shift Option A
[	Option U, A	]	Option N, A

« Option ~, A » Option I, A

‹ Option N, Shift N › Option U, Shift O

‹ Option A › Option C

boxes and bars

■ N ❑ O ❒ P ❑ Q

❒ R | X ▮ Y ▮ Z

card suits

♠ Option E ♣ Option R

♥ Option @2 ♦ Option G

check marks and x's

✓ 3 ✔ 4 ✕ 5

✖ 6 ✗ 7 ✘ 8

crosses

✙ 9 † = ✛ ; ✝ Shift ?/

✚ Shift :; ✜ Shift < ✞ Shift > ✠ Shift @2

fat quotes

❞ Shift ~` ❝ Shift {[

❟ Shift |\ ❛ Shift "'

geometric shapes (miscellaneous)

● L ○ M ◗ W ▲ S

▼ T ◆ U ❖ V

hands

✍ [-] ✌ [<,] ☛ [Shift][*8] ☞ [Shift][+=]

miscellaneous

❧ [Option][S] ❦ [Option][&7]

❧ [Option][*8] ¶ [Shift][Option][*8]

numbers (sans serif, black on white)

① [Shift][Option][?/] ⑥ [Option][X]

② [Option][!1] ⑦ [Option][J]

③ [Option][L] ⑧ [Option][|\]

④ [Option][V] ⑨ [Shift][Option][|\]

⑤ [Option][F] ⑩ [Option][:;]

numbers (sans serif, white on black)

❶ [Option][Spacebar] ❻ [Option][Q]

❷ [Option][~`], [Shift][A] ❼ [Option][-]

❸ [Option][N], [Shift][A] ❽ [Shift][Option][-]

❹ [Option][N], [Shift][O] ❾ [Option][{[]

❺ [Shift][Option][Q] ❿ [Shift][Option][{[]

numbers (serif, black on white)

① [Option][U], [Option][U] ⑥ [Shift][Option][+=]

② [Option][+=] ⑦ [Option][<,]

③ [Shift][Option][{[] ⑧ [Option][>.]

④	Shift Option O	⑨	Option Y
⑤	Option % 5	⑩	Option : ;

numbers (serif, white on black)

❶	Option D	❻	Option (9
❷	Option W	❼	Option) 0
❸	Shift Option P	❽	Option Z
❹	Option P	❾	Option { [
❺	Option B	❿	Option O

objects (miscellaneous)

✂	Shift ! 1	✂	Shift " '	✂	Shift # 3
✂	Shift $ 4	☎	Shift % 5	✆	Shift & 7
✈	Shift (9	➔	" '	✉	Shift) 0

pens and pencils

✒	! 1	✒	@ 2	✎	) 0
✎	> .	✏	? /		

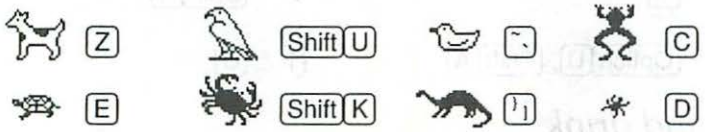
stars

✡	Shift A	✦	Shift F
✧	Shift G	★	Shift H
☆	Shift I	✪	Shift J
☆	Shift K	✯	Shift L
✯	Shift M	✯	Shift N
✯	Shift O	☆	Shift P

Cairo by categories *(AN)*

When Cairo is the selected font, all you have to do to generate any of the pictures shown is hit the key(s) indicated.

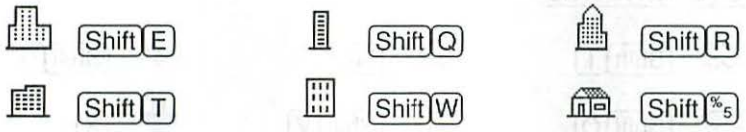
animals



arrows

art tools

buildings



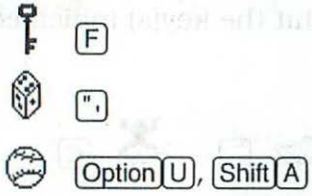
celestial objects

electrical symbols

everyday objects—bigger than your head
(unless your head is very, very big)

everyday objects—smaller than your head

(unless your head is very, very small)



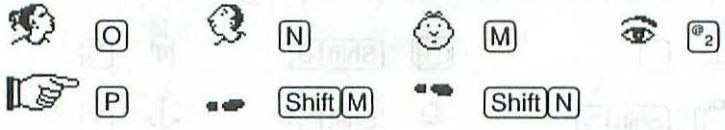
food and drink

fruits

miscellaneous

musical symbols

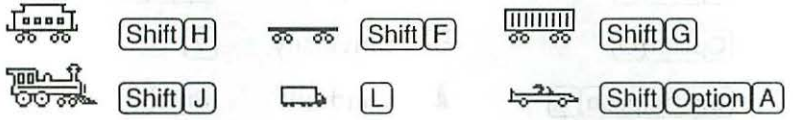
parts of the body



plants & parts of plants

things you wear

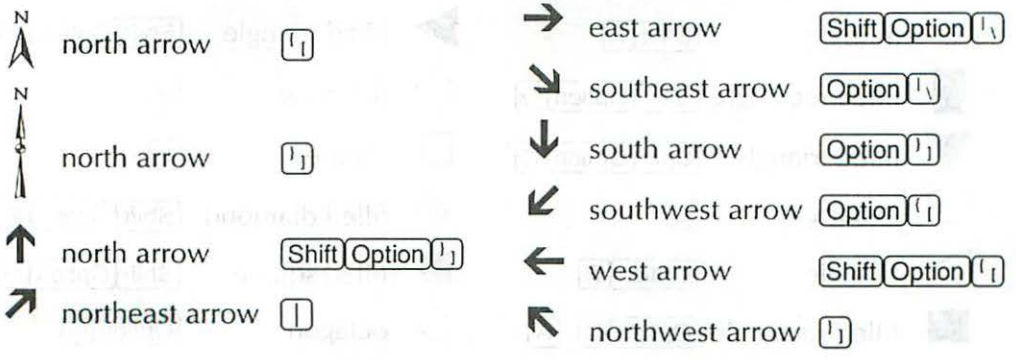
transportation



Carta by categories *(AN/SA/JK)*

Carta ($100) is a font of map-making symbols designed by Lynne Garell and published by Adobe. The list below groups the symbols into logical categories and tells you what they normally represent.

arrows



buildings, etc.

	bank	Shift Q		police	Option W
	cemetery	Shift Option B		post office	Option Z
	church	B		prison	Shift Option Q
	courthouse	Q		ruin	+ =
	hospital	Option ~ `, Shift U		satellite dish	Option < ,
	hospital	X		school	Shift V
	landmark	=		site	Shift Option + =
	lighthouse	-		skyline	C
	mission	Shift B		synagogue	Option V
	mosque	Option B		telephone	Shift Z
	museum	Option Q		university	V
	pagoda	Shift Option V		windmill	Shift -

cities and towns

	city	T		state capital	Option R
	national capital	Shift R		village	Option I , Shift E
	town	Shift T		county seat	Shift E

geometric shapes (large)

	triangle	Shift P		filled triangle	Shift Option X *
	filled rectangle	Shift Option #3		diamond	P
	filled triangle	Shift Option G *		square	L
	rectangle	L		filled diamond	Shift Option P
	triangle	Option P		filled square	Shift Option &7
	filled rectangle	Option N , A		octagon	Option O

* System 7 only

	rectangle	Option L		oval	Shift O
	filled octagon	Option U, Y		filled circle	Shift Option $4
	circle	O		filled oval	Shift Option %5

geometric shapes (small)

	triangle	Shift #3		filled diamond	Option $4
	hexagon	Shift %5		circle	Shift !1
	filled triangle	Option #3		thin plus	Shift Option "'
	filled hexagon	Option %5		thin cross	Option "'
	square	Shift @2		small filled circle	Shift Option W
	star	E		filled circle	Option !1
	filled square	Option @2		large filled circle	Shift Option !1
	half-filled star	Option E, E		inline star	Shift Option R (System 6: Shift Option E)
	diamond	Shift $4		circle in star	Shift Option M (System 6: Shift Option R)
	star in circle	R			

highway signs

	Interstate highway	I
	Interstate highway	Shift Option @2
	US highway	U
	US highway	Shift U
	US highway	Option U, Shift Y (System 6: Shift Option ~)
	California highway	Shift Option)0
	California highway	Option N, Shift O
	county highway	Shift I
	county highway	Shift Option Z (System 7 only)

highway in national forest — Option U, Option U

highway in national forest — Option ~, Shift A

highway on Indian reservation — Option U, Shift E
(System 6: Shift Option U)

highway on Indian reservation — Shift Option *8

Trans-Canada highway — Shift Y

Mexican highway — Y

Mexican highway — Shift Option (9

Mexican highway — Option Y

Mexican highway — Shift Option)0

highway school sign — Shift Option Y

highway school sign — Shift Option K

highway RR crossing — Shift Option L

highway RR crossing — Option I, Shift U

mining and industrial

chemicals — Option X

coal — Option M

dry well — Shift Option :;

factory — Shift Option >.

gas well — Shift Option ?/

gems — Shift Option N
(System 6: Shift Option M)

gold — <,

gravel pit — Option >.

metals — Shift <,

mine shaft — Shift ?/

mining — >.

oil — M

oil well — Shift M

placer — Shift >.

radiation — Shift N

refinery — Shift Option <,

uranium — N

nuclear reactor — Shift Option I
(System 6: Shift Option N)

miscellaneous symbols

	airport, large	Option J
	airport, small	Shift J
	Amtrak	K
	bridge	Shift Option H
	children crossing	Shift ~`
	compass	| \
	dam	Shift K
	hammer & sickle	W
	handicapped	Shift X
	heliport	Shift Option J
	maple leaf	Shift W
	pedestrian crossing	~`
	port of entry	Option K
	registration mark	Shift Option P
	scale	Shift {[
	traffic light	Option ~`, Shift E
	tunnel	Option ?/
	world	C

outdoor recreation

	bicycle trail	Option F		game preserve	S
	bird refuge	Shift S		golf	Shift Option F
	boat	Option H		hiking	Shift F
	boat launching	⇧H		horse trail	Option ~`, Shift I

	campsite	D		hostel	F
	campsite	Shift D		marina	H
	fire	Shift Option S		pack station	Shift Option D
	fish hatchery	Option S		picnic area	Option D
	ranger station	G		skiing	A
	state park	Option G		winter sports	Shift A
	US Fire Service facility	Shift G			

surveying and land use

	benchmark	;		gauging station	/
	boundary	Shift ;		lookout	'
	control	Option ;		lookout control	Shift '

warfare

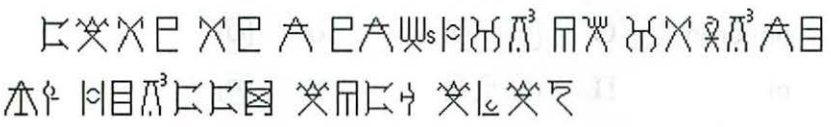
	aircraft carrier	Option 6
	battlefield	Option -
	battleship	Option 7
	castle	Option =
	explosion, flat	Shift Option 6
	explosion	Shift 6
	explosion, filled	Shift 8
	explosion, filled	Shift 7
	fort	Shift Option -
	ICBM	Shift 0
	IRBM	Shift 9
	military air base	J

soldier	Option 0
tank	Option 9
tanker	Option * 8

non-Roman alphabets *(AN/EF)*

Another exciting aspect of fonts on the Mac is the ability to generate foreign—that is, non-Roman—alphabets, especially since you can mix them in freely with regular text. (Roman alphabets—like the ones used for English, French and Spanish—have more or less the same characters as Latin does. Non-Roman alphabets—like the ones used for Greek, Russian, Hebrew, Japanese and Chinese—have different characters.)

There's a wide variety of both bit-mapped and outline non-Roman fonts available—everything from common ones like Greek, Hebrew, katakana (Japanese phonetic characters) and Cyrillic (Russian, etc.) right down to totally obscure ones like Linear B (an early form of Greek writing dating from around 1500 BC). Here's a short sample of it:



One last note about non-Roman alphabets: remember that generating the characters may be only half the battle. For example, unless a Hebrew font comes with a word processor that lets you write from right to left, you'll have to type out the Hebrew text backwards (from left to right).

Symbol's Greek alphabet *(SA/EF/JK)*

The Symbol font that's built into virtually all PostScript laser printers has a complete Greek alphabet—upper- and lowercase—plus a few extra script characters:

name	uppercase		lowercase	
alpha	A	Shift A	α	A
beta	B	Shift B	β	B
gamma	Γ	Shift G	γ	G
delta	Δ	Shift D	δ	D
epsilon	E	Shift E	ε	E
zeta	Z	Shift Z	ζ	Z
eta	H	Shift H	η	H
theta	Θ	Shift Q	θ	Q
iota	I	Shift I	ι	I
kappa	K	Shift K	κ	K
lambda	Λ	Shift L	λ	L
mu	M	Shift M	μ	M
nu	N	Shift N	ν	N
xi	Ξ	Shift X	ξ	X
omicron	O	Shift O	ο	O
pi	Π	Shift P	π	P
rho	P	Shift R	ρ	R
sigma	Σ	Shift S	σ	S
tau	T	Shift T	τ	T
upsilon	Y	Shift U	υ	U
phi	Φ	Shift F	φ	F
chi	X	Shift C	χ	C
psi	Ψ	Shift Y	ψ	Y
omega	Ω	Shift W	ω	W

script characters

ϖ	omega (lowercase)	V
φ	phi (lowercase)	J
ς	sigma (lowercase)	Shift V
ϑ	theta (lowercase)	Shift J
ϒ	upsilon (uppercase)	Shift Option *8

Symbol's symbols *(SA/EF/JK)*

Besides the Greek alphabet shown in the last entry, the Symbol font contains arrows, card suit symbols, a wealth of mathematical and scientific symbols, and pieces of brackets and braces you can use to surround multiple lines of numbers in formulas. (When scientific symbols are also Greek letters, like Σ and π, we haven't repeated them below.)

arrows

↔	Option E, Spacebar	⇔	Shift Option @2
←	Option U, Spacebar	⇐	Shift Option #3
↑	Option +=	⇑	Shift Option $4
→	Shift Option "'	⇒	Shift Option %5
↓	Shift Option O	⇓	Shift Option ^6

card suits

♣	Option S	♦	Option R
♥	Option G	♠	Option @2

mathematical & scientific symbols

∞	infinity	Option *8
f	derivative	Option &7
∝	proportional	Option M

∂	partial differential	Option D
≤	less than or equal	Option #3
≥	greater than or equal	Option >.
≠	not equal	Option P
≡	identical	Option B
≈	approx. equal	Option !9
⊗	circle multiply	Option F
⊕	circle plus	Option X
∅	empty set	Option J
∩	intersection	Option !\
∪	union	Shift Option !\
⊃	proper superset	Option :;
⊇	reflexive superset	Option Spacebar
⊄	not subset	Option ~`, Shift A
⊂	proper subset	Option N, Shift A
⊆	reflexive subset	Option N, Shift O
∈	element	Shift Option Q
∉	not element	Option Q
∠	angle	Option ~-
∇	gradient	Shift Option ~-
√	radical	Option ?/
¬	logical not	Option U, Y
∧	logical and	Option U, Shift Y
∨	logical or	Shift Option !1
∑	summation	Option I, Shift A

(it's larger than the regular capital sigma)

brackets and braces (pieces)

⌠	integral, top	Option I, Shift U
⎮	integral, center	Option ~, Shift U
⌡	integral, bottom	Shift Option B
⎛	left parens, top	Option I, Shift E
⎜	left parens, middle	Shift Option Y
⎝	left parens, bottom	Option U, Shift E
⎞	right parens, top	Shift Option I (Shift Option N in System 6)
⎟	right parens, middle	Shift Option N (Shift Option M in System 6)
⎠	right parens, bottom	Shift Option <,
⎧	left brace, top	Shift Option F
⎨	left brace, middle	Option ~, Shift I
⎪	left brace, extension	Shift Option J
⎩	left brace, bottom	Shift Option H
⎫	right brace, top	Shift Option Z (System 7 only)
⎬	right brace, middle	Shift Option G (System 7 only)
⎭	right brace, bottom	Shift Option X (System 7 only)
⎡	left bracket, top	Option ~, Shift E
⎢	left bracket, middle	Shift Option S
⎣	left bracket, bottom	Shift Option D
⎤	right bracket, top	Shift Option >.
⎥	right bracket, middle	Option H
⎦	right bracket, bottom	Option K

A bit-mapped font sampler

Apple's bit-mapped fonts *(AN/EF/JK)*

As of this writing, fifteen bit-mapped fonts come with System 7. **Chicago,** Geneva, Monaco and New York are discussed in the first entry in the next section and Courier, Helvetica, Palatino, Symbol and Times in the second entry. The pictorial font Cairo is displayed by category in the previous section (along with Symbol). The remaining five fonts are shown below:

Athens (all early Mac fonts were named after cities) is a square, sturdy workhorse of a font–good for big, bold items like headlines or titles. It's only available in 18-point, which is what's shown here.

London is a fine example of black-letter or gothic lettering, perfect for certificates, newspaper banners and such. It also comes only in this 18-point size.

Los Angeles is a casual handwriting font, great for dashing off an informal note. This is 12-point; it also comes in 24-point.

Although it's been around since the Mac was first introduced, Venice has withstood the test of time. It's a lovely script font that still appears on many

invitations and menus. Apple only supplies it in this 14-point size, but see the entry on World Class Fonts below.

Arthur can't look at this font (which is called San Francisco—what else?) without re-experiencing the psychedelic rush he felt when he first saw it on the screen of his 128K Mac back in early 1984 (in the bleak days of CP/M and MS DOS, when computers were about as exciting as a talk by Henry Kissinger).

A lot of grave warnings were issued back then about not using this "ransom note" font for business letters—as if most Mac users had IQs down in the room-temperature range. Well, you shouldn't use San Francisco for your will, either—but that doesn't mean you should <u>never</u>

use it. Remember the first Commandment: This is the Mac. It's supposed to be fun.

There's also a TrueType version of San Francisco (all right!); See the entry called *free outline fonts* toward the end of the next section.

Fluent Fonts *(AN)*

Casady & Greene's 66 bit-mapped Fluent Fonts come on a two-disk set that costs $50. In addition to fonts of architectural, astronomical, astrological, biological, chemical, electronic, mathematical, meteorological and even a few yachting symbols (and Hacker, mentioned in the keycaps entry above), it includes some of the most useful and beautiful bit-mapped typefaces I've seen. My personal favorites are:

Nordic. Isn't this a beauty? I could look at it all day. I hope Casady & Greene makes a TrueType or PostScript version of it, to get rid of these jaggies.

Oblique is another font I never tire of. Here again, think how gorgeous it would be in a TrueType or PostScript version, without the jaggies.

Last but not least, there's...

DREAM, A MOUSY LITTLE FONT THAT'S PERFECT FOR SPREAD-SHEETS.

World Class Fonts *(AN)*

Dubl-Click Software puts out a series of bit-mapped fonts that boggle the mind and dazzle the eye. They go by the name of World Class Fonts; there are four three-disk volumes, each of which only costs $90—about $1 a font!

World Class Fonts gives you Venice in 12-point and 24-point (to supplement the 14-point version Apple supplies). You also get several foreign alphabets (Greek, Hebrew, Japanese and Russian) and a vast quantity of unique special characters that are hard to find elsewhere.

Other fonts give you chess pieces (a black set and a white set), postal labels, religious symbols (34 different crosses, among much else), architectural symbols and border designs. There's also Manhattan, described in the key-caps entry above.

Hollywood gives you what must be the ultimate in special characters—not

merely , and , but also HOLLYWOOD. "You know the Hollywood sign that stands in the Hollywood hills? I don't think the Christ of the Andes ever blessed so many ills." (A little something for you Dory Previn fans.) Hollywood is based on the classic 30's font Broadway.

There are dozens of other useful and interesting fonts and, as if all that weren't enough, you get some great utilities with the disk. (See the entries on BigCaps and Font Charter in the font utilities section below.) The manual is terrific, the selection is astounding and the value is incredible.

a free bit-mapped font *(AN)*

There are lots of public-domain bit-mapped fonts available, but my favorite is Santa Monica, designed by Paul Hoffman. As you can see, its just about the widest font youll ever find (this is just 12-point, believe it or not), which makes it a little hard to use, but I love the way it looks. (It may be a little hard to find, so we'll post it on the Macintosh Bible/Peachpit forum on America Online.)

An outline font sampler

Apple's basic four fonts *(AN/EF/JK)*

There are three fonts the Mac needs to have in the System file in order to run—**Chicago**, Geneva and Monaco. New York isn't required by the System, but we've included it in this entry as well, because it's also been around right from the beginning.

Originally bit-maps, these four fonts are now also available in TrueType format. The TrueType versions, created by veteran type designers Charles Bigelow (who did the original bit-mapped versions) and Kris Holmes, look great at any size, both on the screen and when printed.

Geneva, the font normally used for file and folder names on the desktop, started out as a bit-mapped version of the classic sans-serif typeface Helvetica. It's called Geneva because Helvetica was designed in Switzerland. Helvetica gets *its* name from the official name for Switzerland, *Confoederatio Helvetica,* "the Swiss Confederation" (which is why the international license plate tag for Switzerland is CH).

The Swiss use a Latin name to describe their country so as not to favor any of their four official languages—German, French, Italian and Romansch—over the others. *Helvetica* comes from the name of a Celtic people, the Helvetii, who inhabited Switzerland during the time of Julius Caesar. I don't know how they came by *their* name, but tell me—what other computer book gives you trivia of this *depth?*

The TrueType version of Geneva (which is what you're reading here) has branched off from Helvetica; Bigelow and Holmes began with the bit-mapped font and designed something entirely different *[and, in my book, twice as pretty—AN].*

You look at Chicago so often on menus, in the titles of windows and in dialog boxes, that it's easy to forget how gorgeous it is. (That's only fitting, since it's named after the Garden City, where virtually all the streets are tree-lined and where the lakefront, fringed with parks and beaches, stretches for thirty miles.)

Created by Bigelow specifically for use on the Mac, Chicago is probably the most beautiful and functional bit-mapped font ever designed. To get that much style out of 72 dots per inch is an incredible accomplishment. Fortunately, TrueType Chicago has kept the original's distinctive look, while doing away with the jaggies.

Monaco was Apple's original monospaced font. Holmes' TrueType version of it (which is what you're reading here) is *infinitely* more attractive than the bit mapped version. One problem remains, however: m's and w's look like blobs on the screen when bolded at small sizes (this is hard to avoid in a monospaced font).

New York was the Mac's original serif font, created to complement the sans-serif Geneva. Bigelow and Holmes radically redesigned it in creating the TrueType version.

Bigelow said they wanted the new New York to show "the sophistication, the confidence, the style and braggadocio that is associated with the Big Apple itself—the big-time, glittery, urban excitement of Broadway, Fifth Avenue and the hot spots of the metropolis." (Good grief!) TrueType New York's large x-height and lively variation in line width do just that, making it a classy alternative to the sedate Times, on which it was originally based.

Apple's PostScript fonts (AN)

Most PostScript laser printers—including every LaserWriter but the very first model—come with the following eleven fonts (or, to be precise, font families) built in:

Times is the standard, boring serif typeface. Look at how much smaller it is than Helvetica at the same point size (11-point).

Helvetica is the standard, boring sans serif typeface. Look at how much bigger it is than Times at the same size (11-point).

Courier is an excellent choice if you want to make your laser printer look like a typewriter (what were these people *thinking* of?).

Σψμβολ—that is, Symbol—supplements the other fonts by supplying symbols to them (although you can also get some great stuff by using it directly, as shown in the *Symbolic and pictorial fonts* section above).

As you can see, Avant Garde lives up to its name, even though it's been around for a while. Look at that cap A—so simple, yet so perfectly proportioned.

Bookman, the main font this book is set in, was designed by the master type craftsman Ed Benguiat (there's more about him below, when we talk about the font that bears his name). I particularly love Bookman's bold italics in large sizes (check out any chapter title or section head in this book). Here's what Erfert has to say about it: *Bookman is an attractive, sturdy, unassuming typeface. It doesn't call attention to itself, but goes about the business of being legible.* [God, Erfert, it's not that dull.—AN]

Bookman reminds me of those pretty, good-natured, slightly plump actresses in '40s movies (invariably secretaries, girl reporters or the like) who always ended up as the leading man's pal, while he fell for some exotic number like Mary Astor. [Or, better yet, Sigrid Gurie, "The Siren of the Fjords."—AN]

Adobe offers Bookman in light, light italic, demi and demi italic (the versions included with many laser printers), as well as medium, medium italic, bold and bold italic. The Font Company also offers several styles and weights of Bookman, which are described later in this chapter.—EF

I print out my address book and phone list in Helvetica Narrow, because you can squeeze so much onto a line with it. It really comes in handy for a lot of purposes.

New Century Schoolbook is stolid, sturdy and eminently legible. But why am I talking about it? Like the rest of us, you stared at it until you were cross-eyed when you were a kid at school—unless, of course, you grew up in some other country, looking at some foreign typeface, and are probably now a Communist as a result. No danger of that with New Century Schoolbook—it's ideologically pure.

Classy, elegant, readable, luscious to look at, Palatino was designed by a titan of 20th-century typography, Hermann Zapf (1918–). If you're wondering where the name comes from, look up *palatine* and *the Palatinate* in a good dictionary (even *I* can't justify the kind of digression that would take us on).

As its name implies, Zapf Chancery was also designed by Hermann Zapf. Notice how small Zapf Chancery is for its size (this is 11-point). ***It also works well as a display font. And it has a great ampersand—&.*** *Only one cutting of Zapf Chancery comes with LaserWriters—medium italic, but you can order other styles and weights from Adobe or Bitstream.*

Zapf Dingbats is a pictorial font composed entirely of *dingbats* (typographical ornaments). It's displayed, organized by categories, in the *Symbolic and pictorial fonts* section above.

ITC (AN)

The *ITC* you see before the names of various fonts stands for the International Typeface Corporation of New York City, a powerful force for excellence and innovation in typography. They've been responsible for many beautiful new fonts and for tasteful redesigns of classic fonts like Garamond as well. Part of their agreement when they license a typeface is that their initials be shown as part of the name.

Adobe fonts (AN)

Adobe is the company that developed PostScript, so it's not surprising that they were also the first to publish PostScript fonts. Their library now contains hundreds of fonts, including the ones this book is set in (ITC Bookman, with tables and headers in Optima). They range in price from $90 for some individual cuttings to $370 for some font families.

The first Adobe font I'll describe is the beautiful Benguiat.

IT'S OFTEN USED FOR BOOK TITLES (THE CAP A, B AND Q ARE REALLY BEAUTIFUL, AS YOU CAN SEE), BUT for all its sensuous lushness, it's also an extremely readable font. (The first three editions of The Macintosh Bible were set in Benguiat.)

Benguiat is named after the man who created it, Ed Benguiat (BENG-gat), who is certainly one of the greatest type designers who's ever lived. (I love names, so I took the trouble to find out that his is Spanish, originally from Córdoba. Actually, going further back, it's Moorish, *ben* meaning *son of* in Arabic.)

Anyway, Ed Benguiat, who was born in 1927, is responsible for more than five *hundred* typefaces, including classics like Bookman, Souvenir, Korinna, Tiffany and Charisma. In addition to being a designer and a vice-president at ITC,

he's a pilot and a jazz drummer who's played with Stan Kenton and Woody Herman.

Adobe's version of Benguiat—of Benguiat Book, to be precise—is fine as far as it goes, but that isn't far enough. No italic or italic bold is provided, so when you use these styles they're created algorithmically (calculated by the computer, rather than designed by a human being). That's a pity, because *real* Benguiat italic is *beautiful.*

(But don't despair. Bitstream offers Benguiat in twelve cuttings: book, book italic, book bold, book bold italic, medium, medium italic, condensed, condensed italic, condensed bold, condensed bold italic, condensed medium and condensed medium italic.)

Another Adobe offering is Korinna, a beautiful redesign by Ed Benguiat of a turn-of-the-century typeface. It has the sensual grace that marks all his fonts—not to mention a really great capital U and lowercase italic *f.* It's also very readable and big for its size (this is 11-point). Here's how it looks in **bold**, *italic* and ***bold italic.***

Adobe also offers Benguiat's Souvenir (in Light and Demibold). I once wrote a book for kids that was set in Souvenir and it worked great. It has an informal feel but, at the same time, it's elegant. Here's how it looks in **bold,** *italic and* ***bold italic.***

If there's a prettier sans serif typeface than Optima, I've never seen it. (No wonder, since it was designed by Hermann Zapf.) Why anyone would ever use Helvetica when they could use Optima is something I'll never understand.

Optima is a small font in a given size (11-point, in this case).

IT'S A GREAT DISPLAY FACE TOO, AND LOOKS EVEN BETTER AT THE HIGHER RESOLUTION YOU GET FROM AN IMAGESETTER.

Cooper Black is one of my favorite display faces. *I think Cooper looks even better in italic. You can't make Cooper bold, because it's already black, which is bolder than bold.*

Futura extra bold is terrific for titling and headlines. *It looks good in oblique too.*

Belwe is a classy, ornate font you might use to complain to the lord of the manor about the predatory new crop levies—**SOMETHING YOU WOULDN'T WANT TO DO WITH ITC MACHINE, AN ALL-CAPS FONT WITH A MARKEDLY DIFFERENT FEEL. IT'S GREAT FOR HEADLINES, IF YOU KNOW WHEN TO USE IT (AND WHEN NOT TO).**

LITHOS IS AN ALL-CAPS FONT THAT SIMULATES GREEK WRITING. THIS BEAUTY COMES IN A VARIETY OF WEIGHTS, FROM EXTRA LIGHT AND LIGHT **TO BOLD AND BLACK!**

LITHOS HAS SOME PROBLEMS—IT LACKS ITALICS AND BASIC CHARACTERS LIKE #, + AND FOREIGN ACCENTS—BUT I REALLY LOVE IT AND USED TO USE IT A LOT—UNTIL EVERYONE ELSE STARTED USING IT A LOT TOO.

As long as we're in Europe, let's look at Aachen (AH-khen) bold. It's named after the city in western Germany (near the borders of Belgium and the Netherlands) that was the imperial capital of Charlemagne (or Big Charlie, as we used to call him around the palace school).

Skipping over the Alps, we come to an even prettier Adobe font—Italia. Aren't those diagonal serifs great? Look at that lowercase *i!* Lucida Sans is another beautiful font. **Here it is in bold,** *italic and* ***bold italic.***

Goudy Heavyface is terrific for headlines, *especially in italic*, but

these fonts are all so *ordinary!*
HERE'S UMBRA. FOR WHEN YOU REALLY WANT TO MAKE AN IMPRESSION (IN EVERY SENSE OF THE WORD).

Dom Casual is...well...casual, but it's also really beautiful. I use it for the list of phone calls I have to make each day, and never get tired of looking at it (I get tired of the *phone calls,* but that's another story). Dom Casual has everything you need—*italics,* **bold,** special characters like #, etc.

very good feature

Last but certainly not least is Arnold Böcklin (or Boecklin, for you conscientious umlaut refusers), a sinuous and sensuous Art Nouveau font.

Agfa fonts *(EF)*

What was once Compugraphic is now the Agfa Division of Miles Inc. Agfa offers PostScript and TrueType fonts, both on floppy disks (at prices similar to Adobe's) and on a CD. The CD contains 1900 cuttings, including the 1100 in Adobe's library, as well as Agfa's own fonts. You can use all the screen fonts on the CD, but the printer fonts are locked until you pay $50 per cutting for an access code to unlock them (the CD itself is free with your first order).

The CD also includes a HyperCard stack called *The Art of Typography* that illustrates basic typographic concepts like character, word and line spacing. It's an interactive tutorial that lets you click a button to see word spacing

or leading change, for example. It's a great way for beginners to learn about type.

This elegant text font is called Perpetua. Designed by Monotype, it's also sold by Agfa, Adobe and other type vendors. (By the way, did you know that Miles Inc., which owns Agfa, also makes Flintstones vitamins? They've never explained to my satisfaction why Betty Rubble wasn't included in the vitamins—I suspect some sort of conspiracy. At least the Agfa Division doesn't seem to have left any important characters out of its fonts.)

Visigoth is a wild-looking font reminiscent of its namesakes, the western Goths (Germanic barbarians who overran the Roman Empire in the early Christian era). For some reason, you hardly ever hear about the Ostrogoths, the eastern Goths; they're a people snubbed by history—much like poor Betty Rubble. (You see, Arthur isn't the only one who can introduce trivia tidbits into his font samples.) [No, apparently not. And, to tell the truth, I don't really appreciate the competition. Uneasy lies the head that wears a crown.—AN]

Richard Beatty's fonts *(EF)*

Richard Beatty has designed dozens of text, display, pictorial and border fonts, in both PostScript and TrueType formats. Sold through the FontShop and other vendors, they're available in either the standard keyboard layout or his XT layout, which replaces seldom-used Shift Option characters with small caps, inferior and superior numerals (little numbers that go above and below the line, as in H_2O), ligatures (like fi and fl) and other special characters. Here are a couple of samples:

Beatty's delightful Spiral font is, as he puts it, great for the occasional Victorian lark.

His Greetings font is based on Greeting Monotone, designed in 1927 by Morris Benton.

Bitstream fonts *(AN)*

With hundreds of cuttings so far, Bitstream is one of the major suppliers of Mac fonts. *[They also offer dozens of TrueType fonts and are developing more. Their prices start at $80 for a collection of 20 text fonts and 20 decorative fonts. By the time you read this, all their fonts should be in either TrueType or PostScript Type 1 format.—EF/JK]*

Bitstream publishes many weights of Cooper, from light to black. This is their Cooper black outline. Unfortunately, you can't

make it italic; that's too bad, because I love Cooper in italic. Still, this is awfully nice just as it is.

Bitstream also publishes sixteen versions of Caslon. Given my terror of the ordinary, I requested Caslon Open-face Engravers' Oldstyle, the most exotic of them. Isn't it gorgeous?

Then there's Poster Bodoni. I don't like Bodoni much in most weights, but I love this one.

This paragraph is in Amerigo (named, like America, after the explorer Amerigo Vespucci). It also comes in medium and bold, but don't try to bold them—it messes up the letterspacing. This is, of course, a bug. When a font style can't be bolded, it still shouldn't print out with funny spacing, and many font styles that can't be bolded—Adobe's Hobo or Cooper Black, for example—do show up as bold on the screen but appear in their normal weight—with correct letterspacing—on paper.

Still, this is a bug that's easy to get around. If you get funny spacing in a Bitstream font, assume you're trying to bold a style of the font that can't be bolded.

Finally, there's Life. (Where would we be without it?) I'm not sure what the mystery of Life is. Could it be that it comes in *italic,* **bold *and bold italic?*** No, that's too ordinary to be a mystery. In any case, don't you think this gorgeous font deserves better than these wretched, half-witted puns of mine?

One final note about Bitstream fonts: Some of their printer font files have the same names as Adobe's, even

though their names on the font menu are different. So if you're using both Bitstream's and Adobe's versions of a font (which may be unlikely, unless you're writing a chapter like this), make sure to put them in different folders. If you don't, the second one you drag into the folder will replace the first.

Casady & Greene fonts *(AN)*

Casady & Greene offers some really beautiful outline fonts. Here are a few from the 81-cutting Fluent Laser Fonts Library ($180 list), a collection of PostScript and TrueType fonts:

MONTEREY IS AN ADAPTATION OF A CLASSIC FACE CALLED PEIGNOT (PAIN-YOH). ISN'T IT EXQUISITE? I USE IT IN MY LETTERHEAD. THERE'S ALSO A MONTEREY MEDIUM (SLIGHTLY HEAVIER AND WIDER) AND YOU CAN MAKE EITHER THE REGULAR FONT OR THE MEDIUM **BOLD (BUT THE TWO LOOK THE SAME).** *HERE'S HOW IT LOOKS IN ITALIC.*

One of my favorite Casady & Greene fonts is Dorovar. Isn't it gorgeous? For years I used it for notes or memos, and sometimes found myself trying to think of what else I could write, just so I could keep looking at this font.

Another favorite of mine is Gazelle. It's got a great lowercase d (which doesn't do a

lot for readability, however). Gazelle really looks dramatic on the page. Here's how it looks in ***bold****,* ***italic*** *and* ***bold italic.***

Casady & Greene also has an Old English (or "black letter") font called Gregorian. You may remember it from The Ten Commandments at the beginning of the book.

Another medieval font of theirs is Kells. It's what's called an uncial (UN-chul) font—that is, it resembles the lettering used in Irish and English manuscripts during the Middle Ages.

As you can see, Gatsby Light is an elegant face ideally suited for a fancy invitation or an ad for a store that sells expensive women's clothing. But it's sometimes nice to work against the grain of a font, so I think it might be fun to use this for, say, a boxing poster, or an ad for a demolition derby. Of course no one would *come*, but that's the price you have to pay for making art. (It also comes in a demibold weight.)

Several Casady & Greene fonts aren't in the Fluent Laser Fonts Library; they're sold separately at $70–$140 per volume:

Hobo is one of my favorite fonts, but Adobe's Hobo can't be bolded. Casady & Greene's version of Hobo, called Harlequin, **comes in a bold and an extra-bold cutting. (I wonder why I like these heavy weights so much. Is it because I'm bold myself, or because I'm really a shy little mouse who *wants* to be bold?)**

very good feature

You can also get several turn-of-the-century fonts (it's almost time for them again). My favorite is this one, Moulin Rouge, *but there's also Bonnard (named, I assume, after the painter)* and Epoque (after *La Belle Époque*, "the beautiful epoch"—a French name for the first years of this century).

very good feature

There's also a font called Troubador that has great decorative initial caps (provided as a separate companion font):

Castle Systems fonts (EF)

Jason Castle has created what I think are some of the best display fonts available for the Mac, at $80 per cutting ($30 for additional ones in the same family). His fonts are available in both PostScript and TrueType formats, but they don't all contain the full character set, since many are intended just for titles or headlines.

Metropolis Bold is based on a 1930s font by W. Schwerdtner. It's one of my all-time favorite Macintosh fonts.

GOUDY STOUT IS A REVIVAL OF A PLAYFUL DISPLAY FACE BY THE WELL-KNOWN TYPE DESIGNER FREDERIC GOUDY. I ESPECIALLY LIKE THE A, WHICH APPEARS TO BE TAKING A LITTLE STROLL.

Electric Typographer fonts (EF)

Electric Typographer Judith Sutcliffe started out as a calligrapher, then discovered the Mac and began crafting digital (computerized) fonts. She offers several PostScript fonts in calligraphic and handwriting styles at $80 each, including the two shown here.

Abelard is based on sixteenth-century lettering [even though poor Abelard himself was twelfth-century—

AN, and Flourish is an elegant calligraphic font that can add panache to any document.

Font Company fonts *(AN)*

Although Adobe was for many years the largest supplier of PostScript fonts, that honor now goes to the Font Company of Scottsdale AZ which offers over 1700! cuttings (that is, typeface-style combinations). Prices range from $50 for a single cutting to $170 for a family of four cuttings. Needless to say, there are a lot worth mentioning in there, including one of my very favorites:

Nicholas Cochin (pronounced *nee-koh-lah koh-SHAN,* with a nasal *n* as in *bon)* is named after—stop waving your hand, I'll call on you in a minute—its creator, an 18th-century French designer, engraver, painter and writer with more than 1500 works of art to his credit. Cochin (the font, not the man) resembles the writing on ancient maps. Poetry looks wonderful printed in it (and my poetry needs all the help it can get).

Almost as elegant as Cochin is Golden, which was designed by the 19th-century British polymath William Morris. (Isn't that hyphen great? It makes me just want to hy-phen-ate like cra-zy.) Golden comes in two other weights: bold and black (this is plain).

WILLIAM MORRIS ALSO DESIGNED THIS BEAUTIFUL ALL-CAPS FONT CALLED LIBERTY FOR THE LONDON DEPARTMENT STORE OF THE SAME NAME.

THIS SMALL CAPS FONT IS CALLED PLAZA (AFTER THE HOTEL, I ASSUME). AS YOU CAN SEE, IT'S VERY THIN, TALL AND NARROW—EXCEPT FOR THE O'S. OOOOH!

I don't know if Bottleneck originated in the 60s, but you sure saw a lot of it on posters back then. Get this font (and the Image Club's Amelia) and when the 60s come back, you'll be ready.

This lush lollapolooza of a font is called Candice. It has swash caps to die for: A B C D E F G H I J K L M N O P Q R S T U V W X Y Z.

And we'll bring this entry to a close with Cabaret. I use this for letters to my senators, so they'll take me seriously. It's also good for a to-do list if you don't really want to get a lot done.

FontHaus fonts (EF)

FontHaus is one of my favorite sources for high-quality, innovative designs. They offer hundreds of PostScript fonts licensed from major foundries like Adobe, Bitstream, Linotype and Monotype, as well as smaller ones like LetterPerfect and Castle Systems. Among these are many that you won't find anywhere else.

IN 1991, ITC RELEASED ANNA AS PART OF THEIR TYPOGRAPHICA SERIES. THIS POPULAR FONT WAS DESIGNED BY DANIEL PELAVIN AND COMPUTERIZED BY ELSNER+FLAKE DESIGN STUDIOS IN GERMANY.

ALSO IN 1991, ITC BROUGHT OUT BEESKNEES. INSPIRED BY MARX BROTHERS' MOVIE POSTERS (AND OTHERS), BEESKNEES WAS DESIGNED BY DAVID FAREY AND COMPUTERIZED BY ELSNER+FLAKE.

very good feature

ITC's Mona Lisa Recut is based on a 1930s font by Albert Auspurg. It was redesigned by Pat Hickson and computerized by Elsner+Flake.

Image Club fonts (AN)

Image Club offers hundreds of typefaces. They send you a CD with all their fonts (and their extensive clip-art collection) on it. The CD itself costs $100 and gives you access to 20 font cuttings and one volume of art. When you buy another font ($25 a cutting), they tell you the code that unlocks it, so you can copy and use it. (This paragraph is in their clean, elegant, classy Caslon.)

very good feature

I waited a long time for Bauhaus to show up on the Mac. Image Club gives you a nice selection of weights in it too. This is light, and there's also a medium, **a bold (which is probably the weight most often used), a heavy and even** a heavy outline. (I'll give you more of the heavy, bold and medium in the next paragraph.)

gossip/ trivia

Bauhaus is named for the famous architecture school founded in 1919 in Weimar by Walter Gropius (*bauhaus* literally means *building house*), but I don't know if the typeface was actually designed there.

Broadway is a classic font from the 30s (at least that's when it was the most popular). It looks particularly good in its *engraved* style—and I'm particularly glad that I can *show* you what *engraved* means without having to try to define it in words.

Amelia also harkens back to another era—in this case, the 60s. If you lived through those times, you're probably getting a contact high just from reading this.

BUSORAMA IS AN ALL-CAPS ART DECO FONT. YOU'VE BEEN SEEING IT AROUND YOUR WHOLE LIFE—ISN'T IT NEAT TO KNOW WHAT IT'S CALLED? IT COMES IN MEDIUM, LIGHT AND BOLD.

Daily Tribune is an Old English, or black letter, font like Casady & Greene's Gregorian, but it's engraved, which gives it a wonderful feeling of depth

CARTOON IS MODELED AFTER THE KIND OF LETTERING YOU FIND IN CARTOONS. SINCE THAT LETTERING ONLY USES CAPS, SO DOES THIS FONT.

Finally, There's Rock-Ola, It's perfect For The

very good feature

Fine print on labels. Then you don't want your customers to know that your medicine contains medicine oil. Isn't it the greatest?

Lazy Dog Foundry fonts *(EF)*

Lazy Dog offers the most personalized font possible—they'll create a custom PostScript font from your handwriting ($200 for 80 characters). They also put out a $100 collection called *Type of the Twenties and Thirties*, with fonts like

Harpers. which blends simplicity and sophistication.

Letraset fonts *(EF/AN)*

Letraset's Fontek type library is a wonderful collection of display faces in PostScript and TrueType formats at $40 per face. They vary from ornate script to geometric modern designs. Here are a couple of samples:

Balmoral script looks like it flowed from a pen rather than a printer. This elegant face was created by British designer Martin Wait.

ENVIRO IS AN ALL-CAPS FONT BY F. SCOTT GARLAND. WHAT A GREAT NAME

(F. SCOTT GARLAND. THAT IS. NOT ENVIRO). AND WHAT A GREAT FONT. JUST LOOOOK AT THOSE OOOOO'S! IT'S BASED ON TYPE STYLES FROM THE 1920S AND 1930S.

LetterPerfect fonts *(AN)*

The most beautiful brush-style script font I've ever seen is LetterPerfect's Spring. It also comes in a lighter weight, SpringLight (half the calories).

A little learning is a dangerous thing/Drink deep, or taste not the Pierian spring. (Pope)

Stirring dull roots with spring rain. (Eliot) Oh Wind, if winter comes, can spring be far behind? (Shelley)

LetterPerfect fonts are a bargain, ranging from $10–$45 a cutting. And that includes a set of EPS outlines for each letter (in addition to the regular screen and printer fonts); you can alter them in programs like FreeHand and Illustrator.

free outline fonts *(AN/JK)*

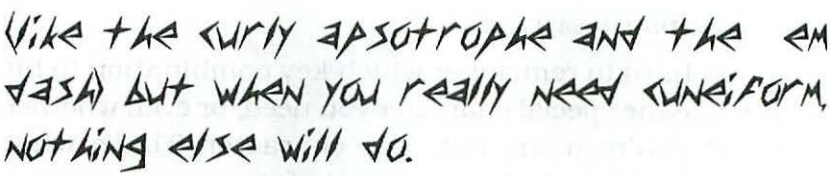
There are lots of great outline fonts that you can download for free from bulletin boards or info services. Here are a few of our favorites:

THIS PUBLIC-DOMAIN POSTSCRIPT FONT IS CALLED CRACKLINGFIRE. TRY PRINTING IT OUT AND THEN COLORING IN THE FLAMES WITH AN ORANGE OR RED MARKER. (KAREN DID THAT ON A SIGN SHE PUT OVER THE SINK IN OUR OFFICE. IT READS: "SQUEEZE OUT THE SPONGE OR BURN IN HELL. THE CHOICE IS YOURS.")

Hank Gillette did this TrueType version of San Francisco. (Thanks, Hank.) Called Saint Francis, it's available on America Online and elsewere, and is shown in one of HyperActive Software's font catalogs (described in the next entry).

What if your job calls for something in cuneiform (perhaps a memo to the main office back in Babylon)? You could just haul out your old clay tablet (it's over there behind those ewers) and knock one off, but you're wearing your good suit and you're afraid you'll get the cuffs dirty.

No problem. Just use cuneiFont, the public-domain outline font you're reading right now. It's missing some characters



TempoFontItalic provides musical notation: 𝄞 𝄢 𝄽 𝄼 𝄻 𝄺 𝅘𝅥𝅮 𝅘𝅥𝅮𝅘𝅥𝅮 𝅘𝅥𝅮𝅘𝅥𝅮𝅘𝅥𝅮 𝅘𝅥𝅮𝅘𝅥𝅮𝅘𝅥𝅮𝅘𝅥𝅮 𝅗𝅥 𝅗𝅥𝅮 *m pf* 𝄢 ♮ ♯ 8va Ped.

And last but not least, there's the the flashy and dashing Impulse.

sources for outline fonts *(EF)*

FontShop and Precision Type sell fonts from dozens of publishers at good prices, so take a look at their catalogs (FontShop's costs $50). For *really* inexpensive outline fonts, check out FontBank, which sells 250 fonts for $100.

You can find public-domain and shareware fonts through user groups, electronic bulletin boards and information services like America Online. But if you're more of a hard-copy sort of person, HyperActive Software *[What a great name!—AN]* offers wonderful catalogs of public-domain and shareware font samples for only $8 each (plus $3 shipping). Four volumes are available so far, but there may be more by the time you read this. (See Appendix B for contact info on all these sources.)

Font utilities

Suitcase, MasterJuggler and Font/DA Mover *(AN/EF)*

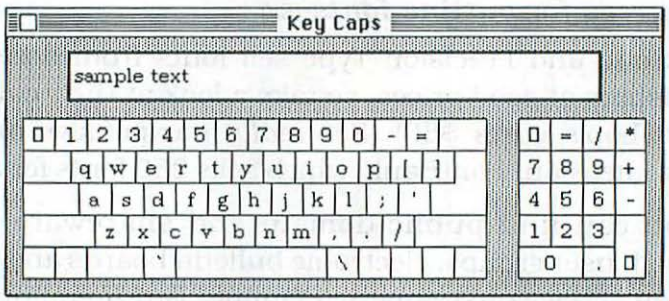
Suitcase and MasterJuggler help you install and organize your fonts, but since they handle sounds and desk accessories too, they're discussed in Chapter 7. Font/DA Mover also handles fonts and DA's, but since it came with System 6 (and isn't needed under System 7), it's discussed in the *System 6 tips* section of Chapter 4.

Key Caps *(AN/SA/EF/JK)*

mostly for beginners

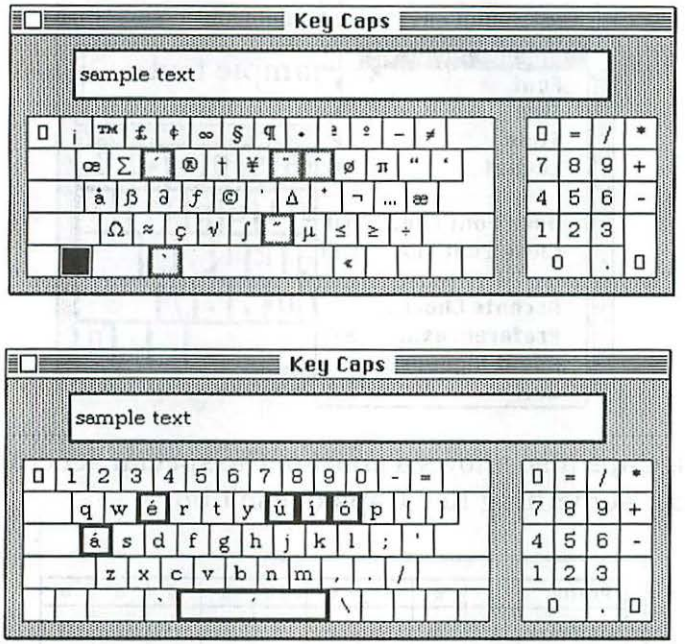
It's often hard to remember which key combination to hit to produce the special character you need, or even whether the font you're using has that character. That's what Apple's Key Caps desk accessory is for.

When you choose Key Caps from the menu, it displays a representation of the Mac's keyboard and puts a new menu title, Key Caps, at the right end of the menu bar. You select the font you're interested in from that menu and the Key Caps display switches over to it (Bookman, in the illustration below.



When you hold down the Shift key, Key Caps darkens the Shift keys on its display and shows you the characters you get in the selected font when you hold down Shift and press another key. But you already know what the Shift characters are (except in fonts composed entirely of pictures and symbols). Where Key Caps really comes in handy is in showing you the characters generated by the Option and Shift Option keys.

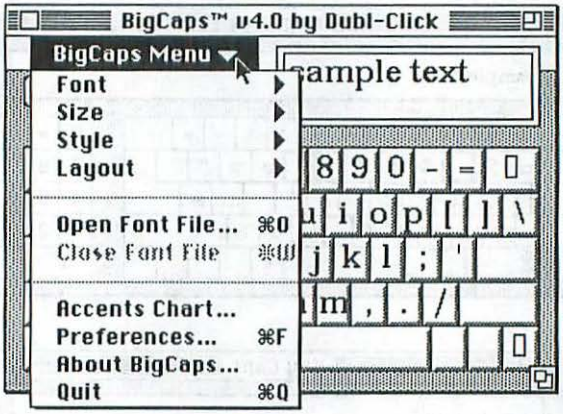
When you hold down Option, it displays a keyboard like the one shown at the top of the next page. System 7's version also shows which keys give you accents you can apply to other letters (they're outlined in gray).When you hit one of these keystrokes (in this case, Option E) the display changes to show which letters you can apply the selected accent to (they're outlined in black, as on the second keyboard).



You can enter text in the sample text area by typing on the keyboard or by clicking on the key you want in the Key Caps window. You can cut or copy this text from Key Caps into any document. (It won't appear in the font you chose in Key Caps, but it's easy enough to change the font once you're back in your document.) If you need a string of special characters, it's usually easier to type them in Key Caps, copy them to your document and then change the font, than it is to remember where each symbol is on the keyboard and type them directly into your document.

BigCaps *(AN/SA/EF/JK)*

BigCaps is a replacement for Key Caps that comes with all of Dubl-Click Software's World Class fonts, as well as their FontCharter utility (described below). It has several advantages: it displays characters in various sizes and styles, its window is resizable, and it can display fonts even when you're not using them and they're not on the menu (see the illustration on the next page).



BigCaps also shows a chart of the special accent characters, something Key Caps doesn't do:

Prefix:	A	a	E	e	I	O	o	U	u
option+e		á	É	é	í		ó		ú
option+`	À	à	-	è	ì		ò		ù
option+i		â		ê	î		ô		û
option+u	Ä	ä		ë	ï	Ö	ö	Ü	ü
option+n	Ã	ã				Õ	õ		

Font Charter *(AN/EF)*

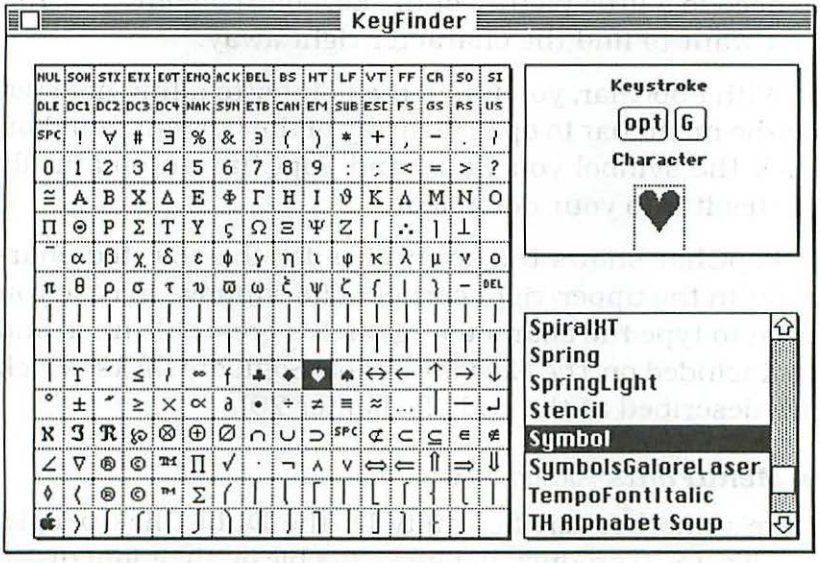
Font Charter is another utility that comes with Dubl-Click Software's World Class fonts and with their MenuFonts utility (described below). It prints out a chart of all the characters in a font, arranged either by their location on the keyboard or by ASCII number.

This is quite handy for comparing fonts. It's a good idea to make a printout of all the fonts you use, either with Font Charter or our template (described above), and put them in a notebook. Then you can refer to them when deciding which font to use.

Dubl-Click used to have another utility, DefaultFont, that's now included as part of FontCharter. It lets you change the font an application defaults to when it first opens. So if you're tired of having to change from Geneva every time you select *New* from the File menu, you'll love this feature. (The World Class Font disks are almost worth the money just for the utilities that come on them—never mind the terrific fonts.)

KeyFinder *(AN)*

Included in Symantec's Norton Utilities is a wonderfully easy-to-use control panel for viewing fonts; it's called KeyFinder. You just pick the font you want from a list box and KeyFinder displays every character in it.



When you click on a character in the display on the left, it's shown in a box in the upper right corner, along with the key(s) that produce it. KeyFinder lets you choose the size of the character shown there but, unfortunately, there's no way to resize the entire window, so that the characters in the box on the left will be bigger.

FontDisplay *(SA/EF/AN)*

Shulman Software's FontDisplay ($50) lets you view fonts in a table (as with KeyFinder above) or as a series of pictures of the keyboard, in whatever size and style you want. (It also shows you the ID number for each font.) One very nice feature is the abilty to select several fonts and print out charts of all of them at once. (FontDisplay isn't System 7-compatible, but it may be by the time you read this.)

PopChar *(ND)*

Hats off to Günther Blaschek; his control panel substitute for Apple's KeyCaps DA is a tool that works just the way you do. When you need a character but don't know which keys to press to produce it, do you want to labor to decode a little picture of the keyboard layout? No! You just want to find the character right away.

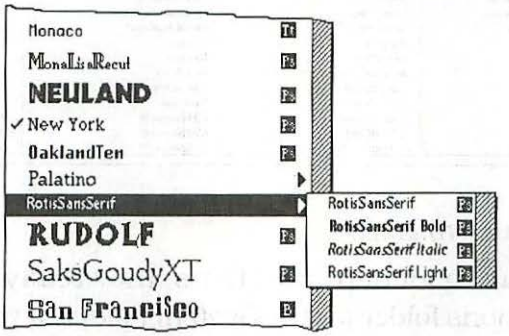
With PopChar, you touch the pointer to a tiny hot spot on the menu bar to open an array of the current font. You click the symbol you want, and PopChar automatically pastes it into your document.

PopChar shows the keystrokes for the selected character in the upper-right corner of its window, in case you need to type the character again. It's great, it's free! and it's included on *The Macintosh Bible Software Disks* (which are described at the end of Chapter 20).

MenuFonts *(SA/EF/JK/AN)*

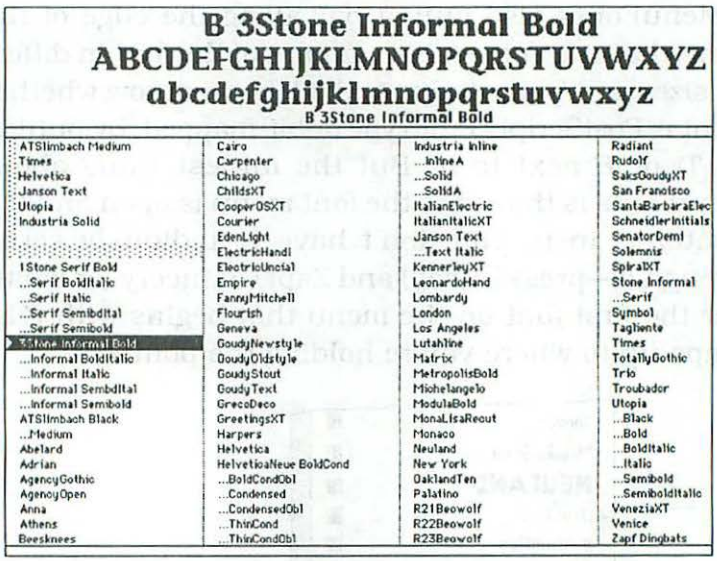
Here's another terrific utility by the Dubl-Click people, but it's a $70 product, not just a freebie on their font disks. It displays font names on the menu in their own fonts. Unlike the similar feature that's built into MacWrite II, Nisus and WriteNow, MenuFonts is smart enough to keep certain fonts in Chicago (so Zapf Dingbats doesn't show up as ✺✪❒❄ ✣✻■✳✪✿▼▲). And unlike Suitcase and MasterJuggler, which also provide true-font menus, the font menu pops down just as quickly as any other.

MenuFonts also puts a bar along the edge of the menu that lets you access samples of the font in different sizes and/or cuttings. And it lets you know whether a font is PostScript, TrueType or bit-mapped, by putting *Ps*, *Tt* or *B* next to it. But the niftiest thing about MenuFonts is that once the font menu is open and the pointer is in it, you don't have to tediously scroll through it—press Z (say) and Zapf Chancery (or whatever the first font on the menu that begins with *Z* is) jumps up to where you're holding the pointer.



Fontina *(EF)*

Eastgate Systems' Fontina ($70) offers a way to show all the font names on a long menu at once—it squeezes them into columns, with weights and styles within a font listed in alphabetical order under the font family name. Using a feature called *Personal Font Knapsack*, you can put the names of frequently used fonts in a corner of the "menu" for easy access. (What you get on the screen is a lot more legible than what's shown at the top of the next page.)



Set Paths *(PH/SA/AN)*

When you use a lot of printer fonts, they really clutter up your Extensions folder (or the System Folder, if you're using System 6). A terrific utility called Set Paths (described in Chapter 7) lets you keep them in another folder (or folders) that you put anywhere you want.

ATM *(EF/SA/AN/JK/Alan Winslow)*

Adobe Type Manager draws PostScript Type 1 fonts on the screen based on the information in their printer files rather than in their bit-mapped screen fonts. This lets you display type at even the largest sizes without the dreaded *jaggies*. ATM also lets you print Type 1 fonts on dot-matrix, inkjet or non-PostScript laser printers, with quality comparable to what a PostScript printer would produce (depending on the resolution of the printer, of course).

It lists for $100, but for you, seeing as you're Becky's niece and your *zayda* and my *zayda* were *landsmen [Feeling confused? You need* Every Goy's Guide to Common Jewish Expressions *by Arthur Naiman, available at fine*

stores everywhere]—for you, as I was saying before that unseemly interruption, we'll make a special price—$7.50. Just call 800 521 1976, extension 4400, and ask for Saul.

Actually, you don't have to ask for Saul. This super deal is the result of an agreement Apple made with Adobe as "an interim step" while they work on adding ATM's capabilities to the Mac's system software (which may have already happened by the time you read this). The only difference is that the $7.50 version comes with one font, Garamond, instead of Times, Helvetica, Courier and Symbol (I'd rather have Garamond than those four anyway).

Here's how 48-point Bookman looks on the screen without ATM:

Bookman

Here's how 48-point Bookman looks on the screen with ATM:

Bookman

The current version of ATM is much faster than the original, but it can still bog down work on a Classic or a Plus, or printing on an ImageWriter. To get rid of the slowdown while you're working on a document, make sure you've got screen fonts installed in the sizes you're using; it's only when you're using sizes that *aren't installed* that ATM has to create them for the screen.

One problem with ATM is that it forces you to keep printer files in your System Folder, even for fonts that are built into your laser printer or that you've downloaded permanently to a hard disk attached to the printer. ATM also makes some smaller fonts in certain styles virtually

unreadable. Bold, italic and bold italics suffer the most. For example, compare the two samples of Bookman bold italic below:

Here's 12-point Bookman Bold Italic with ATM on.

Here's 12-point Bookman Bold Italic with ATM off.

Plain text looks more readable with ATM, but it doesn't always supply all the characters (there's not always a curly apostrophe, for example)—compare the samples shown.

Here's 13-point Bookman with ATM on.

Here's 13-point Bookman with ATM off.

Here's 9-point Benguiat with ATM on.

Here's 9-point Benguiat with ATM off.

✎ *Metamorphosis Professional* (EF)

This $150 utility from Altsys lets you convert between Type 1 and Type 3 PostScript font formats, so ATM can scale them to look smooth on the screen and when printed on non-PostScript printers. It also lets you convert fonts:

- between TrueType and PostScript formats
- into PICT or EPS graphic outlines, so you can treat characters as graphic elements in programs like Canvas, Freehand or Illustrator
- into formats that let you use them on other computers, like the IBM PC

✎ *FontMonger* (EF)

Like Metamorphosis, FontMonger ($100, from Ares Software) is one of the most versatile font utilities around. It also lets you convert between TrueType, PostScript, Type 1 and Type 3 formats. You can even add characters to a font.

Say you're writing a scientific paper in Palatino, and find yourself frequently needing certain Greek letters from the Symbol font. Rather than constantly switching between the two fonts, you can add the Symbol characters you need to Palatino and then type both the text and symbols from your new, combination font.

FontMonger can alter characters in any font to create fractions, small caps, superscripts and subscripts, and narrow, wide or slanted characters (of course, these algorithmic alterations won't look as good as special characters created by a type designer). It can even import Illustrator or FreeHand artwork into a font, or change characters' positions on the keyboard.

ParaFont *(EF)*

Like FontMonger, ParaFont ($100, from Design Science) lets you create special characters using an existing font. In addition to fractions, small caps and wide or narrow characters, Parafont produces old-style numerals (some of which dip below the baseline, making them more attractive in text passages) and several ligatures (combined letter pairs like fi or fl; ParaFont also offers ff, ffi and ffl ligatures).

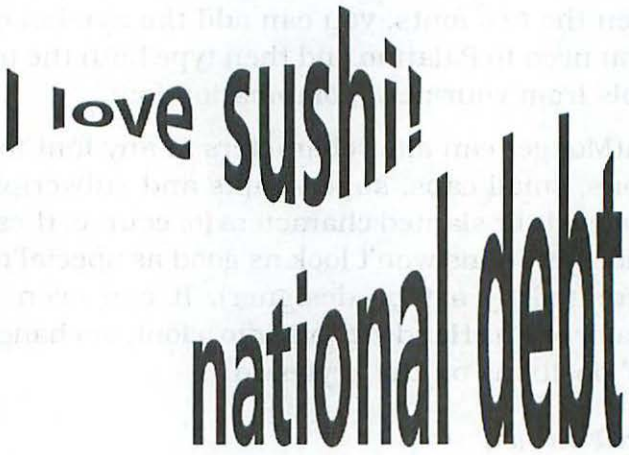
type-manipulation programs *(SA/JK)*

Graphics programs let you manipulate text to a certain extent—the characters are forced to bind to a specific path, say—but you can generally only change the type itself in a few simple ways (squeezing or stretching it for example—see *creating special typographic effects* earlier in the chapter). Programs specifically designed to manipulate type do a whole lot more, as you'll see in the next several entries.

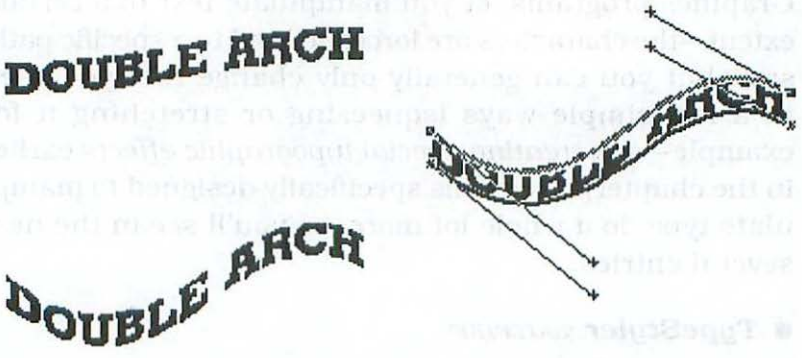
TypeStyler *(SA/EF/KF)*

TypeStyler ($220, from Brøderbund) lets you get right to work (or play) by providing editable fonts and a library of

35 basic shapes in which to put them. Below are two—the fish ("I love sushi") and the top arch ("national debt").



You can make the shapes larger or smaller, fatter or skinnier just by changing the size of the rectangle they're in. You can edit the basic shapes in the library or create your own. In the illustration below, the original shape is in the upper left. On the right, you see it being edited (you drag on the handles to change the curves of the shape). Bottom left is the result. (This is what they look like on the screen—printing them on a laser printer will eliminate the jaggies.)



Reshaped text can be printed from TypeStyler or exported to a graphics program. TypeStyler can handle any TrueType or PostScript fonts, but needs to convert them to its own SmoothFont format before it can work on them. (It converts TrueType and Type 1 fonts automatically, and comes with a utility to convert Type 3 fonts.)

LetraStudio *(EF)*

Like TypeStyler, Letraset's LetraStudio ($250) lets you place TrueType or PostScript text into *envelopes* of various shapes. You can reshape an envelope to get the effect you want on a particular selection of text, and save the modified envelope for later use.

You can even embellish text with color graphics or artwork imported from Illustrator or FreeHand, and LetraStudio's effects can be applied to these graphics as well. Here are some of the effects you can achieve:

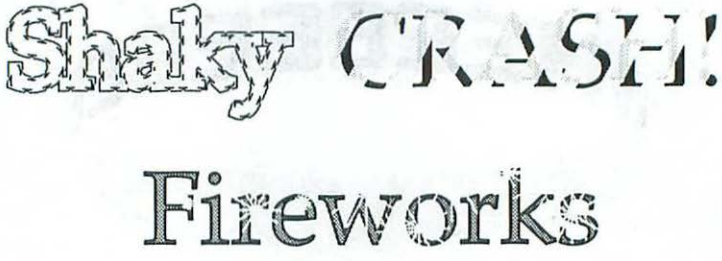
LetraStudio provides a limited set of drawing tools (including a line, a circle and a rectangle); for more complex work,

you can paste your text effect into a graphics program and work on it there.

Effects Specialist *(EF)*

Rather than providing shapes, Effects Specialist ($200, from Postcraft International) comes with a library of 120 special effects you can apply to PostScript fonts. They range from the mundane (outlining characters or adding a drop shadow) to the exotic (a chrome texture, text on a musical staff, text in a spiral shape) to the bizarre (text made out of railroad tracks, run over by tire treads, or filled with piano keys). You tailor them by setting features like character color (or gray shade), outline shade and width, character fill pattern and shadow angle.

Although many of the effects are wacky enough to make the underlying text downright unreadable, I had a lot of fun playing with them. One of my favorites is Shaky:



Fontographer *(SA/EF)*

Altsys' Fontographer ($500) lets you design your own PostScript or TrueType fonts. If you don't want to start from scratch, you can also import an existing font and modify the character outlines. You can even paste in a bit map for a character and trace over it, but you can't import a whole bit-mapped font in one fell swoop.

Fontographer's drawing tools are adequate, but if you want better ones, you can save characters as PostScript

graphics and import them into FreeHand or Illustrator. Altsys keeps adding tools and features; with version 3.5, you can make an entire font lighter or heavier, and there's a tool that works with pressure-sensitive tablets to let you transform calligraphic strokes into outline fonts.

FontStudio *(EF)*

Like Fontographer, Letraset's FontStudio ($600) lets you import and alter existing outline fonts or draw new ones from scratch, in either PostScript or TrueType format, and it can save characters as PostScript graphics for modification in Illustrator or FreeHand. But FontStudio is geared toward font families, whereas Fontographer uses a separate utility to merge different weights and styles into a single family.

FontStudio also has Fontographer beat when it comes to displaying fonts on the screen; it allows you to create *antialiased* screen fonts, which use pixels of varying brightness to give them fuzzy edges (which—paradoxically—makes them easier to read).

FontStudio and Fontographer are locked in an ongoing features war, which means font designers can look forward to seeing continual improvements in both programs.

Font problems

font bugs *(AN)*

Years ago, while chatting with a pioneer Mac type designer named Richard Ware, I said something about how fonts are easier to design than programs, because at least you don't have to worry about bugs. He laughed heartily, and I've subsequently discovered why. Here's a list of some of the font bugs, and bad design features, you may come across:

- Some fonts are missing characters (you hit #, say, but get nothing). Some fonts don't even have basic punctuation, so you have to import periods, commas, apostrophes, etc. from another font every time you want to use them. This is nothing but laziness on the part of the designer and the publisher, and few such crippled fonts are worth bothering with (one that is is Dream, shown in the *bit-mapped font sampler* section above).
- Some fonts are missing type styles (no bold and/or no italic).

- When you make some bold fonts bold, you get what looks like boldface on the screen, but on paper you just get screwed-up letter spacing, or a sort of doubled image. If a font doesn't want to be bold, OK. But then it should just ignore the boldfacing command, not mess up the printout as a result of it.
- You shouldn't need to install italic and bold screen fonts; the font should know, when you select the italic or bold, to use the bold or italic printer font. (Yes, I know it's obvious, but some fonts don't do it.)

- Some all-caps fonts (Liberty and Enviro, for example) require you to type everything in caps; otherwise, the letters don't show up. This is an incredible pain, and means you can't simply select normal upper- and lowercase text and switch it into these fonts. All-caps fonts should produce a cap whether you type a cap or a lowercase letter, the way Lithos and Umbra do.

To avoid most of these annoyances, always test a font out before buying it; print out a font template (like the one at the end of the *Font basics* section above) in the font, and see what's missing from it.

dimmed fonts on application menus *(SA/EF)*

Sometimes a font's name appears dimmed on an application's menu. This means you've created a document that contains a certain font and then reopened it (on your system or someone else's) when that font is no longer available. (It happens because many applications keep track of fonts by name rather than by number.)

font ID conflicts *(AN/SA/EF/JK/Paulann Thurmon)*

In the beginning, the Mac came with a selection of eleven bit-mapped fonts, and Apple allowed for a total of 256 different ID numbers for them, the first 128 of which it reserved for its own use. In other words, it anticipated that there would never be more than 128 third-party Macintosh fonts. Since there are probably a hundred times that many today, this has to be one of the most incredible underestimates in the history of computing.

Apple responded—belatedly—with a new numbering system called *NFNT*, for *new font numbering table* (the old numbers were called, descriptively enough, FONTs). Even with 16,000 NFNT numbers, however, there are still *font ID conflicts* (two fonts with the same number)—the result of sloppiness on the part of font publishers or of Apple (which assigns the ranges).

Font ID conflicts will soon be a thing of the past, since almost all Mac applications now access fonts by name rather than by number, and font publishers use a special company abbreviation in their font names to make sure that name conflicts don't occur. Even before that system becomes universal, font conflicts shouldn't bother you much, because font ID numbers are reassignable. When you install a font that has the same number as another font that's already installed, the newcomer simply gets assigned a different number.

Where font ID conflicts become a problem is when you use another system, where that font's ID number *hasn't* been changed. The easy solution is to bring your own hard disk (or floppies) with your System file and/or suitcase files on it (or them) whenever you print out at a service bureau or on a friend's Mac. But you can also print out the ID numbers of your fonts and the fonts on the other system, and see if they match. (If they do, you're home free.)

FontDisplay (described above) shows you the ID numbers of fonts, as does a handy little DA called Font Info (from

Regional Typographers). Font Info also counts the fonts you have installed, points out any conflicts, and tells you how many there are. Both FONTastic and ResEdit show ID numbers and let you change them too. You can even display them in Word (believe it or not). Here's how:

Start a new document and choose *Save* from the File menu. In Word 5, you'll see the words *Save File as Type.* Click on the downward-pointing triangle and select *Interchange Format (RTF)* from the pop-up menu that appears. If you're using Word 4 or an earlier version, click the *File Format* button and choose *Interchange Format (RTF).* Click *OK*, name the document and click *Save.* The fonts in your document will all be listed, with their ID numbers between backslashes in front of the font name (and preceded by an *f).* There will also be some lowercase words before the font names *(swiss, modern, script,* etc.); just ignore them.

Another option is to send a PostScript file instead of the actual document you've created to the foreign printer—PostScript files identify fonts by name. If you've got the LaserWriter selected in the Chooser and you're using version 7.0 or later of the LaserWriter driver, you can create a PostScript file simply by clicking on the appropriate button(s) in the Print dialog box. If not, some programs, like PageMaker, give you that option from within the program.

✎ *two font menu puzzlers* (SA/AN/JK)

Sometimes you know you have a font installed, but it doesn't appear on the Font menu. This may be because you opened the suitcase file the font is in after you launched the application you're in; if that's not the case, it may be because you have different fonts with the same ID number in separate suitcases.

The Mac looks for screen fonts first in the current application (it's possible, though pretty pointless, to install fonts directly into applications), then in the System file

and finally in any open suitcase files, starting with the most recently opened one. (This order may change in System 7.1, which won't keep fonts in the System file.) If you have fonts with conflicting ID numbers in various places, the first one the Mac runs across wins.

Another problem this can cause is when you choose a font from the menu but a different font is applied to the selected text. If you can't resolve the font conflict, install your important fonts in the System file, so they get priority.

weird font size mystery *(AN)*

There's a bizarre bug in some screen fonts that I haven't been able to track down the reason for, even though I've been trying for years; knowledgeable tech-support people don't seem to understand it very well, or give reasons for it that don't make sense. Still, it's worth telling you about it, so your heart won't stop the way mine did the first time you see it.

Under certain circumstances, where there are *no* font ID conflicts (as verified by Font Info or some other utility), one screen font will be substituted for another in a certain small range (or ranges) of sizes. Increase or decrease the size significantly, or even leave it the same and go to a different view (200% or 50%, say), and the invader font disappears. The real font shows up on the font menu, and the text prints out correctly in that font (except the letterspacing may be screwed up, if the invader font is different enough from the real font).

The invader font only appears when the real font is *displayed* at a certain size (or range of sizes), but you get it no matter what program you're in and no matter what type style you change the text into. And there's no way to tell what it is, unless you happen to recognize it.

The first time I saw the problem was in the Ten Commandments section of Chapter 1, when Adobe's

Arnold Böcklin was substituted for Adobe's Zapf Chancery. Let me tell you, Böcklin was not meant to be a text face; I thought two fonts were printed over each other. *[I've run into a similar problem, but in my case a font claimed it was one thing (Futura Bold) but displayed as another (Hobo). I've found Suitcase helpful in tracking down these impostors and de-installing them. I can't comment on your bug, because I haven't experienced it.—EF]*

If you have any idea what's going on here, drop a line to the Grand High Imperial Keeper of the Font Mysteries, G&B, Box 7635, Berserkeley CA 94707 (or *Mac.Bible* on AppleLink or *Mac Bible* on America Online). Thanks.

✎ *font families on menus* (AN/SA/EF/KF)

The Mac was designed to handle a limited number of type styles—bold, italic, etc. (It didn't seem limited at the time, compared to what other computers let you do.) You'd just pick a font and apply a style to it. But now Mac fonts, like regular typesetting fonts, come in a myriad of styles. You want bold? Well, which one—medium, semibold, demibold, bold, extra bold or ultra bold? So you have to pick the style, as well as the font itself, from the menu.

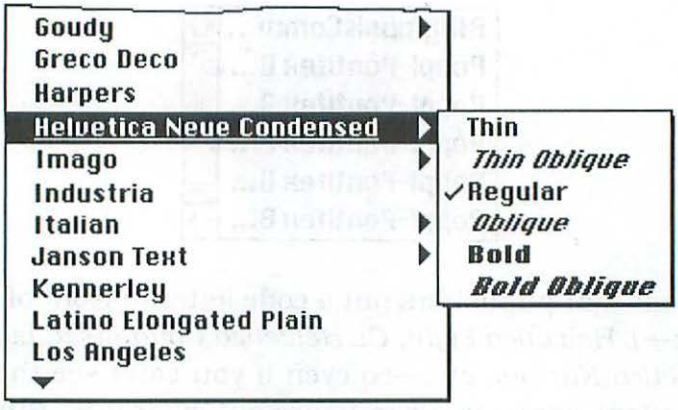
Another problem comes from the narrowness of list boxes. If they were wider, fonts could be named more logically, as in the illustration below. But with the current, narrow list box, you'd get something like the illustration at the top of the next page.

Some font publishers put a code letter in front of their fonts—*L Helvetica Light, CL Helvetica Condensed Light, N Helvetica Narrow,* etc.—so even if you can't see the end of the font name, you can figure out what it is. But this is a stupid approach, because all the styles of a particular font are scattered everywhere. If you have hundreds of fonts on your menu (as many people do), it's easy to completely forget that you've got, say, *T Vag Round Thin* under the T's. Even if you can keep all the far-flung styles in mind, you still have go all over hell-and-gone to get them.

The *sensible* approach is to shorten the font *name* (it's heresy, we know) and put the style codes *after* it. So you'd have *Helv L, Helv CL, Helv N,* etc. Pretty obvious, huh? Well, if common sense were common, we'd be living in a different world.

Adobe publishes a $65 extension called Type Reunion (originally called Family Reunion, a much cleverer name) that organizes fonts into families, and puts all the styles of the font family onto a submenu. It works OK, but slows down the menu quite a bit. It also prevents you from using QuicKeys to change fonts from the keyboard (unless you're choosing a solo font—one with no other members of its family on the menu; QuicKeys can handle those).

The illustration at the top of the next page shows you how the font menu works with Type Reunion installed. The selected font family is underlined in the main menu and the selected weight or style is checked in the submenu.



a font by any other publisher (SA/EF/AN)

Many fonts are published by more than one company; Brush Script, for example, is available from seven publishers. Although most fonts with the same name look a lot alike (not surprisingly), they're not always identical.

While Adobe, Agfa, Linotype, Monotype and Varityper cross-license each other's fonts (in other words, the same digital version of a font created at Linotype might be sold by Adobe, Agfa, and so on), a font with the same name from, say, Bitstream, The Font Company or Image Club will be a completely different cutting. If you use Bitstream's Brush Script in a document and then print it out on a system that has Adobe's Brush Script installed (using a program that identifies fonts by name, like PageMaker), you're in for an unpleasant surprise. Not only will the font itself look different, the spacing will be thrown off too. (Apple has been working with font companies to try and come up with naming conventions to avoid such conflicts.)

If you take a document from your own Mac to print at the office or a service bureau, make sure you find out which company's font the other Mac uses (and/or bring your version along and substitute it—but remember to Trash it on the other Mac after you finish printing).

Chapter 7

Utilities

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Managing utilities

utility basics (AN)

Utilities are programs that perform relatively simple tasks—like searching for a specific file on a disk, setting an alarm, clipping a picture or counting the words in a document. (Some utilities perform relatively complex tasks, but in that case, they're support tasks for the creation of documents—managing fonts, for example.) Utilities come in various forms—most commonly as *stand-alone programs, desk accessories* (usually called *DA's), extensions* and *control panels.*

When it makes more sense to do so, we cover some utilities in other chapters; for example, Acta, an outliner in the form of a DA, is covered in Chapter 9 (word processing), and Apple's basic utilities are covered in Chapter 4 (basic Mac software). In this chapter, we cover other general-purpose utilities and ones that span categories, like programs used for resizing art before you paste it into a word processing document.

extensions and control panels (SA/ND/JK/AN)

Extensions (called *inits* in System 6) are loaded automatically into memory when you start up your Mac; as that happens, their icons appear at the bottom of your screen. Extensions use anywhere from 2K to 200K of memory (we haven't seen one larger than that), so if you don't have a lot of RAM, be careful how many you use. Another potential problem with extensions is that they can clash with other system software or with an application. For more on this, see the entry called *extension and control panel conflicts* in Chapter 8.

Some control panels (called *cdevs* in System 6) also load at startup; they have the same drawbacks as extensions, and the term *extension* is often used (in this book and elsewhere)

to include them. But unlike extensions, when you double-click any control panel, you get a window where you can configure some aspect of your Mac or a peripheral device. (Some even allow you to choose which other control panels and extensions load at startup—see the next entry.)

❦ *extension managers* (SA/ND/JK/AN)

An *extension* (or *init) manager* is a utility that lets you select which extensions and control panels load at startup (without having to drag them out of the System Folder). A good one also lets you rename them to change their loading order (since extensions and control panels load alphabetically) and can be called up on startup before they load (so you can specify which ones should be turned on or off this time around, without having to restart again to make your choices take effect). Normally, extensions load before control panels, but some extension managers let you tell control panels to load first, which you can't accomplish just by renaming them.

InitPicker ($70 list from Microseeds) is the most versatile of the extension managers. As its package declares, it "helps you manage the tangled web of inits that are supposed to make your system more productive, but frequently only serve to screw things up." InitPicker lets you check the extensions you want to run, either at startup or in its control panel; it also creates sets of extensions to run together and tells you how much memory each one is using. There's even a special utility, BombGuard, that detects clashes and prevents one of the clashers from loading. (Extensions Manager is a decent noncommercial alternative—and it's free.)

❦ *freeware and shareware utilities* (SA/ND/AN)

Many utilities are available as free software (known as *freeware)* or as *shareware* (try it and pay for it only if you like it and continue using it). A lot of these programs do things

too minor to interest a commercial publisher, yet are quite useful. (We urge you to always send in the fee for shareware you use regularly; it encourages the author to come up with more goodies, and you sometimes receive documentation or upgrades not available to nonregistered users.)

One advantage of freeware and shareware, besides its low price, is that it tends to get updated more often than commercial software (most authors are very responsive to user feedback). Its major drawback is that it's tested much less than commercial products before it's released, so it's more likely to crash your system or to clash with other programs. It's also more likely to be marred by interface idiosyncracies that make it hard to learn and use. And since there's no technical support, you're on your own.

You get freeware and shareware through user groups, online services and bulletin boards. (We also offer a two-meg collection of the best freeware and shareware; it's called *The Macintosh Bible Software Disks* and is described at the end of Chapter 20. Several of the utilities discussed in this chapter are on the disks.)

Substitutes for basic Apple utilities

Calc+ *(SS)*

Calc+ ($60 from Abbott Systems) does basic arithmetic and, in its graphics mode, can calculate in inches, centimeters, picas or ciceros and quickly switch between them. You can copy results to the Clipboard and then paste them into any document. *[I'm looking for an inexpensive calculator, on the Mac or otherwise, that will calculate hours, minutes and seconds as well as decimal numbers. If you know of one, let me know.—AN]*

Unlike Apple's Calculator, Calc+ has no calculator keys on-screen; you enter numbers from the Mac's keypad or keyboard. Some people may miss the on-screen keypad, but I find typing on real keys a lot faster than clicking "keys" with the mouse.

You can set the font, size and number of decimal places for the display and generate a printout of the calculator's tape. You can also resize the calculator window as necessary or reduce it to an icon to get it out of the way yet keep it within reach. Calc+ is easy to use, and there's decent online help in case you need it.

❦ *Calculator Construction Set* (AN)

If neither Apple's regular calculator DA nor Calc+ suit you, Dubl-Click Software's $90 Calculator Construction Set may be just what you want. It lets you assemble the ultimate monster calculator of your dreams (you can stretch it to any size you want and keep loading in the keys). Then when you're done, you can install it as a desk accessory.

Rather than go into endless detail about all the functions Calculator Construction Set makes available, I'll just say that if you want something, it's almost certainly got it. And the user interface is good, so you won't have any trouble creating what you want.

❦ *Scrapbook substitutes* (SA/ND/AN)

SmartScrap) is a terrific Scrapbook substitute, and it comes with the handy Clipper DA that lets you crop or scale the contents of the Clipboard before pasting it ($90 for both from Portfolio Systems). SmartScrap lets you select all or any part of a stored image for copying. You can name each page of the Scrapbook and then search through the contents by name, or build a table of contents that contains miniature pictures of the contents of each page (to go to the page you want, you just double-click

on its little picture). Finally, SmartScrap lets you access multiple Scrapbook files, without having to constantly change their names.

ClickPaste ($100 list, from Mainstay) is a great idea—a hierarchical Scrapbook (folders within folders). Version 2 can store sounds and play them back before you paste them.

MultiClip *(ND)*

Apple's Clipboard only holds one thing. Whenever you cut or copy something, it *replaces* whatever was already on the Clipboard—and sometimes you live to regret that. MultiClip gives you lots of clipboards (and scrapbooks for that matter) that you can view, edit or copy to the Scrapbook for more permanent storage. At $150 (from Olduvai), it's a bit steep for a single-function utility, but weigh that against reconstructing the things you throw away by accident with the conventional Clipboard.

file finders *(ND)*

System 7's Find command is pretty slick, but Mr. File ($100 from Softways) goes two steps further—it creates a list of the files it finds, and lets you open, copy or delete items directly from that list. DiskTools and MasterFinder (both parts of Fifth Generation's $130 File Director) can search by file size or modification date, and they run even faster than Apple's Find command. (Also see the *Utility collections* section and the review of DiskTop below.)

Basura and Trash Chute *(ND)*

Both of these freeware programs improve on the Trash. Fred Monroe's Basura (the name is Spanish for *garbage)* is an extension that gives you keyboard shortcuts for throwing things away—you just select something, hit ⇧⌘Delete, and away it goes (Option⇧⌘Delete empties the Trash as well). Trash Chute (by Melissa Rogers) empties the Trash

in System 7 whenever you shut down the Mac, the way it works in System 6.

Suitcase and MasterJuggler *(SS/HK/ND)*

Both Fifth Generation Systems' Suitcase II ($80 list) and Alsoft's MasterJuggler ($50) help you manage fonts and/or DA's in suitcase files. If you're running System 6 and have more than a handful of DA's and fonts, you need one of these programs. But even under System 7, they help you conserve memory because you open specialized fonts only when you need them instead of cluttering up your System (and font menus) with them at all times.

Both programs let you open suitcase files automatically at startup or while you're working. Both include utilities that help resolve font ID conflicts (details in Chapter 6). MasterJuggler also includes an application launcher that helps you open frequently used programs and documents without constantly sifting through layers of folders, an aid for anyone who works on varied projects.

[I'd be lost without Suitcase. I put all the fonts used in Chapter 6 of this book into one suitcase file, and I use Suitcase to make it active whenever I need to print (or view) that chapter; otherwise, I leave it closed, so I can get to the bottom of my font menu before the end of this century. All my fonts are organized in suitcases (with names like essential fonts, fun favorites, sometimes used, seldom used) *and I swap them in and out with Suitcase. Most of the Mac experts I know think of Suitcase (or MasterJuggler) virtually as system software. If you use more than a few dozen fonts or DA's, you need one of these programs.—AN]*

[I've never used MasterJuggler, but I hate Suitcase because its interface is so counterintuitive. I mean, really, to have to select Quit *to confirm that you've finished selecting things to open...sputter, sputter. This is sort of a side rant to my basic rant about how bloody difficult all this font stuff has become. I wish the font publishers would quit their*

political/commercial fighting about standards and make the damn things easy to work with. If Suitcase makes things easier, it's only from unmanageable to barely acceptable. Suitcase is about as easy for a novice to use as a VCR is to program. Harumph.—ND]

[Well, I agree, actually. I've gotten used to Suitcase's interface, but it certainly was confusing at first.—AN]

Utility collections

MacTools 2.0 (LA)

MacTools 2.0 ($150 list, from Central Point Software) combines complete backup and virus protection utilities with a comprehensive set of disk maintenance utilities and repair and recovery tools.

DiskFix, a powerful volume repair and recovery utility, can fix many types of disk problems—including some that Norton can't deal with (of course, Norton can also fix some that MacTools can't). MacTools' repair and recovery schemes are impressive; remarkably, DiskFix can undo the changes it made if a repair attempt goes awry. Another feature worth the price of admission: you can schedule automatic backups and routine hard drive maintenance—and they can take place without your supervision as long as you don't need to change disks or cartridges.

Unfortunately, MacTools lacks adequate online help, which is particularly frustrating because the interface isn't always self-explanatory. I was also disappointed that this version dropped FastCopy, a floppy disk copier, from the package. It may sound like a trivial concern, but you should *always* duplicate damaged floppies before attempting repairs. MacTools also takes up a lot of memory—the four extensions together consume 500K and most of the other utilities require *at least* a meg.

911 Utilities (SS)

911 Utilities ($150 list from Microcom) is a collection of disk- and file-troubleshooting tools that once was sold under the name 1st Aid. If you want to keep the number of extensions in your system to a minimum, this may be the package for you, since the modules come in the form of stand-alone programs.

911's main utility, 1st Aid HFS, diagnoses and repairs disk- and file-related problems. It can check and repair disks, save an archival copy of a disk's volume information (to help repair the disk if it becomes damaged), copy floppy disks (even damaged ones) and permanently remove deleted files. 1st Aid can also distinguish between uninitialized and unreadable floppies, and repair the boot blocks of any startup disk.

Sector Collector checks disks for bad blocks, then records the blocks as unusable so none of your data will be written to them. There's also Minor Repairs, which allows you to rebuild the desktop of any disk without losing the comments entered into the files' Get Info boxes. My favorite, though, is Complete Undelete. This amazingly simple-to-use control panel helps you resurrect files after you've tossed them in the Trash. Even if they've been partly overwritten since you threw them away, this utility will salvage what's left.

911 Utilities' extensive *Troubleshooting Guide* may be the most valuable part of the package. No matter what trouble you're having, you can look up the symptoms and find concrete steps you can take to resolve the problem. This 300-page resource should be on every Macintosh user's bookshelf.

Norton Utilities (SS)

The Norton Utilities collection ($150 from Symantec) provides programs, desk accessories, extensions and

control panels for protecting and recovering data. The core program, Norton Disk Doctor, can examine any disk, then report and correct problems. *[The manual's troubleshooting section is excellent.—LA]*

SpeedDisk defragments files and reorganizes drive contents for optimal speed. Unlike most disk optimizers, Speed Disk classifies all files according to type and then places the least frequently changed types at the beginning of the disk. (The order used is: the disk directory; System file; extensions and control panels; fonts and DA's; programs; document files; and desktop files.)

There are fourteen other utilities in the collection, including an updated Directory Assistance, which modifies Open, Save and Save As... dialog boxes by adding a menu bar to streamline hard disk navigation. Menu options let you perform Finder activities (copy or delete files, create new folders, Get Info) and reorganize the file and folder listings from within the dialog box.

Now Utilities *(DP)*

For $130, Now Utilities 3.02 gives you ten useful, polished software gadgets that are designed to improve your working environment. The crown jewel is Super Boomerang, a behind-the-scenes file tracker. Every time you use the *Open* or *Save* command of a program, Boomerang is there to greet you—listing files and folders you use a lot, offering a sizzlingly fast *Find* button, identifying each file's size, type and location, and showing you the contents of the last folder you opened. It makes opening files a little sluggish, but you spend a lot less time foraging for misfiled files.

NowMenus makes your Apple menu hierarchical, so you can jump directly to a certain control panel. WYSIWYG Menus consolidates your font menus (so *B Times Bold* and *I Times Italic* go on a submenu under *Times)* and displays each font name in its own font. The other modules include an excellent extension manager. Version 4.0 should be

available soon; it will have only seven modules (including the four mentioned here) but even more power.

Probably the best feature of this collection is that, after several years on the market, the kinks and bugs have long since been ironed out of these handy modules. They're guaranteed to work together.

PowerBook utilities *(LA)*

Connectix PowerBook Utilities (usually known as CPU) is the first collection of utilities to arrive for PowerBook users. It's a low-cost ($100), easy-to-use package that packs a multitude of utilities into a single control panel.

The most valuable features in the collection help prolong battery life by letting you configure the timers that dim or turn off the backlighting, spin down the hard disk, rest the processor and put the PowerBook to sleep. CPU keeps track of those settings for both battery and AC power, and automatically switches settings when you change power sources. It displays information on battery status and provides other indicators that help users conserve battery power. The manual also includes tips for maximizing battery life.

Instant-Wake bypasses the ten- to fifteen-second delay that ordinarily occurs when a just-awakened PowerBook performs a series of tests. (It still performs the tests, but slips them in when you won't notice them.) CPU provides keyboard shortcuts for menu commands, dialog boxes and functions like putting the PowerBook to sleep and spinning down the hard drive. It includes a security program, a keyboard command that locates the cursor and an LCD screen saver. It even lets you disable the Caps Lock key. (On the PowerBooks' smaller keyboards, it's easy to hit Caps Lock by accident.)

You can save many different sets of custom CPU settings, which makes it easy to instantaneously configure the

PowerBook for different people or different locations. Instead of changing all the CPU settings one by one each time you leave your desk, you can just choose your custom travel settings and hit the road. (CPU comes with six predefined environments, including home, office and travel.)

By the time you read this, CPU may have some competition; look for Baseline Publishing's PowerBoost Utilities and After Hours Software's Gum-P. There's also a large selection of freeware and shareware PowerBook utilities. They generally just do one thing, and they're not as polished as CPU, but you can't beat the price—unless otherwise noted, the programs listed below are free.

Insomnia (by Stephen Somogyi) disables rest mode when you run a PowerBook on AC power. When you're running on battery power, Backlight Control (by Ricardo Batista) turns off the screen's backlight after a specified length of time without keyboard or mouse activity. SpinD (by Bill Steinberg) spins down the hard drive. Siesta ($5 shareware, by Andrew Welch) puts the PowerBook to sleep. (These last two are *FKeys*, utilities in the form of a keyboard command.)

Zync (by Ricardo Batista) is a file-reconciliation utility that copies files between your PowerBook and a desktop computer so that both can be kept abreast of changes. Ram Preserves ($5 shareware, by Richard D. McLeod) copies the desired file structure to the RAM disk at startup, and copies modified files back to the hard drive at shutdown. SafeSleep (by Bill Steinberg) blanks the screen and requests a password for access when the Mac is awakened. CapsKiller (by S. Kevin Hester) disables the caps lock key. FindCursor init (by Mike Samuels) locates a lost cursor.

File handlers and Finder substitutes

DiskTop (CR/SS)

very good feature

CE Software's DiskTop ($100) is a desk accessory that does so many things so well that it's hard to describe them all. For openers, it lets you find, open, delete, copy, move and rename files or folders (and eject, unmount or erase disks) without going to the Finder. It also gives you information on files—either the kind provided in the Finder's Get Info window or the more technical information that's useful to programmers. It can even calculate the total size of selected files—extremely handy when you're trying to move multiple files to a floppy disk.

Instead of simply showing you disk icons, DiskTop tells you the capacity and remaining free space on each disk. You can search for files by name, type, creator, date created, date last modified or size—and in the case of the last three categories, you can enter ranges (e.g. find all the files that were modified in the last two weeks). You can search for files whose names begin with, contain or exactly match the letters you type.

DiskTop can search multiple disks simultaneously *very* quickly—Steve can search 320MB of hard disks in about 30 seconds! When it finds a file, it lists it and keeps on going. When you select the name of a file it's found, DiskTop displays a graphic map of where that file is located. You can open the file (or launch the application) straight from that map by double-clicking on its name. You can also create a temporary list of all the files DiskTop found, so you can do something with all of them at once—like copying, moving or deleting them.

DiskTop comes with a decent manual and several bonus utilities, including (in version 4.02) GOfer, a powerful text-search utility that's reviewed below.

Findswell *(CR)*

Apple's Finder *Find* command works quickly and well, but Findswell ($30 from Working Software) puts a *Find* button in every *Open...* or *Save As...* dialog box, just where you need it most. Click the button and a window opens that lets you search for files; when you find one, its *pathname* (all the nested folders it's in) is shown. You can also navigate through files and folders the way you do in an Open window, and you can open any file you come across that was created by the application you're currently running (which saves you the trouble of quitting Findswell and going into the application's own Open window).

But Findswell's nicest feature is its ability to remember the last files you opened (you tell it how many) so you can return to them quickly—whether it's an hour or a week later. Findswell also lets you mark frequently used files so that they always appear in the Findswell window; if they're stuck deep inside two or three folders, this gets you to them much faster.

DisKeeper *(Chris Allen/ND)*

DisKeeper is a $10 shareware disk cataloger written by J. Geagan. It helps you manage disks that are cluttered with multiple copies of applications and files, that have junk buried several folders deep, or that just have too many files. It lists all the files and indicates which are locked, invisible, identical to each other, have no data in them or are "orphans" (their creator application can't be found, and thus they appear as the plain, generic-document icon). It also tells you which folders are empty, invisible or contain only one item.

DisKeeper saves this information to a Word text file that can be read by most word processors and spreadsheets. It can also move identical files, empty files and the like to a folder called *DisKeeper Trash*. Quite a lot of value for $10, don't you think?

Set Paths *(AN)*

This incredibly useful freeware utility from Bruce Tomlin helps prevent clutter in your System Folder (and interminable waits when you open it). It lets you specify up to five additional folders that programs will look in when they normally look in the System Folder.

This lets you put away all those things that have to be in the System Folder, like help files, but that don't have their own folders, the way extensions, fonts and Apple menu items do. Normally you put the additional folders in the System Folder, but they can be anywhere on the disk. All you have to do to set them up is open the Set Paths control panel and click on them.

Compression utilities

file compression basics *(Skye Lininger/AN)*

When you're sending files over phone lines, or trying to squeeze them onto crowded disks, it's a good idea to use a compression utility. These handy programs compress (or *compact)* files into *archives* that are much smaller than the originals.

Compression utilities work by removing the redundancy present in most documents. For example, in this book, the word *and* appears thousands of times. If you replace each *and* with a single character, you save 67% of the space they took up. Using techniques like that, compression utilities can typically squeeze a 100K word

processing document down to about 33K, and a 100K graphics scan in TIFF format to as little as 7K. Applications usually don't condense as much, because programs are partially compressed when they're written.

Compression utilities can also fit a very large file or group of files onto a series of floppies by splitting it into as many archives as necessary. When you want the data back, the program expands (or *extracts)* the split-up information from the various archives and reassembles it.

The names of archives usually end with a three-letter tag that identifies the program that compressed it and/or the sort of file it is. For example, a *self-extracting archive*—one you can expand simply by double-clicking on it, without the compression utility that created it needing to be around—often bears the tag *.sea* at the end of the file name.

StuffIt *(Skye Lininger/JK/ND)*

When Raymond Lau was in high school, he wrote a shareware program called StuffIt, which fast became the most popular Mac compression utility in the world. It's now evolved into a commercial product called StuffIt Deluxe ($100 list, from Aladdin Systems) and a related shareware version called StuffIt Lite ($25 shareware).

StuffIt Deluxe is somewhat faster than StuffIt Lite, and it has lots more bells and whistles—virus protection, password protection, file management tools and more, enough to add 1.5MB to your hard disk. A new version came out just at press time that lets you compress files automatically in the background. We hear it's slick and fast, but we haven't had a chance to try it.

Compared to StuffIt Deluxe, StuffIt Lite is blessedly simple (but it still takes 47 minutes to download at 2400 bps). The two programs share the same file format, so they can open each other's archives. Unfortunately, the

previous shareware version, StuffIt 1.5.1, can't open archives created by either.

Both versions can create self-extracting archives (but not StuffIt 1.5.1). StuffIt Deluxe can also expand files compressed in the ZIP format that's popular on IBM PC compatibles (which may be helpful in offices). StuffIt archives usually bear the tag *.sit* at the end of the file name.

[I've always loved the fact that you don't talk about compressing files with StuffIt—you stuff *them. And you don't expand them—you* unstuff *them.—AN]*

❦ *Compact Pro* (JK)

Compact Pro is a $25 shareware program by Bill Goodman. It's comparable to StuffIt Lite—a basic program with no pretensions—but it's fast and incredibly efficient, even when creating self-extracting archives. You often save 65% or 70%, and we once saved more than 80%.

Compact Pro can also expand StuffIt 1.5.1 archives, which is useful, since StuffIt is still very widely used. Its own archives usually bear the tag *.cpt* at the end of the file name. (Compact Pro is included on *The Macintosh Bible Disks.)*

❦ *DiskDoubler* (HK)

Like other compression programs, Salient Software's DiskDoubler ($80) lets you shrink selected applications and files by a respectable 35% or 40% (although rarely does it shrink anything in half, as the name "doubler" suggests). It also splits big files so they'll fit on floppy disks. *[DiskDoubler can only extract archives it created itself, not those compressed by other utilities.—Skye Lininger]*

What sets DiskDoubler apart from other programs is its ease of use. Instead of a zillion cryptically named menu items and options, there's simply *Compress, Expand,*

Split/Join and *Help*. You can't get more straightforward than that.

AutoDoubler *(HK)*

Whereas DiskDoubler only compresses the files you specify, Salient's $80 AutoDoubler extension automatically squeezes *everything* on your hard disk. You simply install it and it goes to work. When you want to use compressed files and applications, just open them as you normally do—AutoDoubler expands them on the fly and then compresses them again when you're done.

AutoDoubler noticeably slows down opening or closing files (how much depends on the file's size and content). You can get around some of that by excluding files from compression, but doing that is a bit tricky. Personally, I already have plenty of disk space, and I like to decide what stuff to compress and what to leave alone (see the next entry). But if you've got a cramped hard drive, AutoDoubler could serve as a stopgap solution. *[AutoDoubler can handle DiskDoubler but not StuffIt files.—Skye Lininger]*

SuperDisk! and More Disk Space *(Skye Lininger)*

Add *.s* to the name of any file, folder or disk, and SuperDisk! ($90 from Alysis) will compress it automatically. (This is handy, and makes it easy to tell at a glance what's compressed.) Add *.x* and SuperDisk! will automatically create a self-extracting archive. Add *.exe* and the files will self-extract under MS-DOS.

SuperDisk! also lets you compress files manually with menu or keyboard commands. Alysis' more advanced program, More Disk Space ($100), can handle files that were compressed by StuffIt Deluxe or DiskDoubler.

Text tools

❦ FlashWrite (SS)

The NotePad DA that Apple ships with the Mac is virtually useless—its pages are tiny, and there are only eight of them. FlashWrite II is one of the newest NotePad substitutes—a $15 shareware DA by Andrew Welch.

Unlike the choice of Geneva, Geneva or Geneva that NotePad gives you, FlashWrite II lets you select a different font, style and size for each page. FlashWrite's window is resizable—you can zoom it out to fill the entire screen. It can import and export pages as text-only files, and a word-count feature reports the number of letters, words, sentences and paragraphs on the current page.

❦ miniWriter (AN)

This is many Mac veterans' favorite note-taking DA. Written by David Dunham of Maitreya Design, it's fast, slick, has a great (and accurate) word-count function, and only costs $12. I couldn't live without it.

❦ QuickDex (PH)

This is the ultimate note-taking DA—so intuitive I can't even *imagine* using the manual. You write on the equivalent of index cards and then toss them in the card box. The Find command works at lightning speed and searches for any word on any card. You can easily create different card stacks; QuickDex II keeps track of all of them at once. It costs $60 (from Casady & Greene). *[It's also available as part of the Super QuickDex package ($90), bundled with a printing manager and a DA for printing single envelopes or labels.—ND]*

❦ KiwiEnvelopes! (SS)

For all the convenience word processors provide, they're not very good at printing envelopes. But the KiwiEn-

velopes! DA ($50 from Kiwi Software) does the job handily. It prints letter- or legal-size envelopes one at a time, with or without postal bar codes, on various dot-matrix, inkjet and laser printers.

KiwiEnvelopes! stores addresses you use repeatedly, or you can put a single address on the Clipboard and print directly from there. You can set a different font, size and style (normal, bold or italic) for the return address, mailing address and an optional message (like *Air Mail)* that prints in the lower-left corner. You can also use a bit-mapped or PICT graphic in place of text. A Preview option lets you check an envelope layout before printing it.

KiwiEnvelopes! is ridiculously easy to use, but all it can do is print single envelopes. It can't print labels or do a few envelopes at once. But for another $10 or so, you can buy a more versatile program like INtouch—with the same envelope printing capabilities, plus an address-book database, contact notes and phone dialing (it's described in Chapter 12).

Lookup *(CR)*

Lookup is a $40 desk accessory from Working Software that checks your spelling as you type in any program—database, spreadsheet, page layout, word processor, whatever. In most programs, you can also highlight a word to be checked and then automatically replace it with an alternative Lookup suggests (it often gives you several choices).

It's nice to have access to a large dictionary—the same one used in Spellswell—from inside any application, but Lookup can only check individual words in text you've typed after activating the DA. If you don't like the beep-while-you-type style, see the spelling checker reviews at the end of Chapter 9.

✎ *Temperament* (ND)

John Rotenstein must have really gotten tired of removing leftover Word temp files from his hard disk because he wrote this freeware control panel that strips them out. (There, wasn't that simple?) *[Ah, if only all the entries were that simple.—AN]*

✎ *GOfer* (SA/ND)

GOfer ($80 from Microlytics) is a text-search utility—you tell it what text you're looking for and it searches through your entire hard disk (if necessary) to find every occurrence of it. You can set GOfer to look only in certain folders or only through certain types of documents, and you can tell it to find exact matches, ignore case, etc. This is an incredibly handy utility for those times when you know you wrote (or saw) something somewhere, but can't remember where.

✎ *Quote Init* (AN/SA)

As you type, this $15 shareware extension by Lincoln Stein substitutes curly quotation marks (“ ”) for the Mac's standard vertical quotation mark (") and a curly apostrophe (’) for the Mac's standard vertical one ('). It also supplies open and close single quotation marks (‘ ’)—even when they're nested within double quotes—and it also will insert an em dash whenever you type two hyphens in a row.

Quote Init is smart about what to do when (for example, it can recognize the continuation of a long quotation through multiple paragraphs) and on the rare occasions when it makes a mistake (usually when you're inserting punctuation into existing text), corrections are relatively easy—you just backspace over the character and type it again. Once active, Quote Init works in every application (including the Finder). You can choose to have it

automatically install itself at startup or wait for your command, and you can toggle it on and off with a keyboard command.

MacLabel Pro *(KF)*

Anyone who's ever struggled to line up text so it prints accurately on labels will appreciate the convenience of Avery Dennison's $100 MacLabel Pro. This handy program provides templates for printing on things like Rolodex-style cards, postcards and dozens of Avery self-adhesive labels (for file folders, floppy disks, envelopes, price stickers, audio or videocassette labels, etc.) on laser, inkjet and dot-matrix printers.

Once you choose a template, you can type right onto it, or you can import text from a word processor, spreadsheet or database in comma-delimited, tab-delimited, SYLK, ASCII or RTF format. You can customize the templates with built-in drawing tools or with PICT or EPS graphics of your own—your logo, for instance. (Unfortunately, MacLabel Pro doesn't have anything that acts like a pasteboard, so your label may get a little crowded while you're in the process of designing it.)

You can print as many or as few labels on a page as you like, and it's easy to finish up a partially used sheet of labels. There's a nudge feature to help if the first page prints a little too far in one direction. There's even a bar-code feature, which we didn't test.

Graphics tools

Gallery Effects *(SS)*

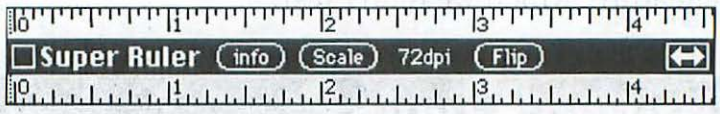
This $200 program from Aldus offers sixteen artistic textures or brushstroke effects you can apply to any bit-mapped image—or to just a part of it. You can use it as

a DA or stand-alone program, or you can add its commands to any program that allows external commands, like SuperPaint 3, Photoshop, Digital Darkroom, HyperCard and SuperCard. Aldus calls this one Volume 1: Classic Art for the Macintosh, so expect a series of them eventually.

The effects are chalk & charcoal, charcoal, chrome, craquelure (cracked surface), dark strokes, dry brush, emboss, film grain, fresco, graphic pen, mosaic, poster edges, ripple, smudge stick, spatter and watercolor. They're great for producing backgrounds, especially for presentations; I made an interesting texture in SuperPaint in less than two minutes by laying down a radial gradient and adding a ripple effect. The program's a good starting point if you want to spruce up your artwork or just make it look as if you actually have talent.

✎ *Super Ruler* (ND)

This simple freeware DA by Randy Ubillos is simply wonderful. Whenever you need to know how large something is on-screen, you pop Super Ruler open and *just measure it.* You can flip it to vertical or horizontal positions, lengthen or shorten it, and match it to your monitor so the scale is accurate. I wish I'd had this back in the primitive days when we were trying to lay out book pages with Word 1.05. (It's included on *The Macintosh Bible Software Disks.)*



✎ *graphics cataloging utilities* (SS)

People who accumulate clip art invariably end up with hundreds or thousands of pictures, PICT drawings and high-resolution TIFF and EPS graphics. To find the one you want quickly, you need a program like Mariah, Multi-

Ad Search or PictureBook+ (all reviewed below); they help you keep track of graphics collections by creating catalogs in which you can view the graphics as thumbnails, and by letting you assign keywords to each of them so they can be categorized and located easily.

If your catalogs will contain memory-hogging images like TIFF files, you'll need plenty of RAM—I'd recommend 4MB to 8MB. Also, plan to invest a lot of time assigning descriptions and/or keywords to each file; without them, your searches will be aimless.

All three programs share one weakness—they don't provide a simple way of cataloging classes of related images. So if you want to assign the same keyword to many images, you have to do it one by one. *[Sounds like a job for a macro program. See the section on them below.—ND]*

[Fortunately, large collections of images usually come with keywords attached—and with a cataloging utility for finding them. For example, the 5800-image Visual Delights collection is thoroughly keyworded (my high-school English teacher is spinning in her grave) and comes with Multi-Ad Search.—AN]

Multi-Ad Search 1.0 *(SS)*

Multi-Ad Search ($200) was designed with network users in mind. One person (normally the network administrator) creates and maintains catalogs and decides if other users can add images, keywords and descriptions.

Of the three products reviewed here, Multi-Ad Search has the most powerful search function. You can search by disk, format (EPS, TIFF, etc), file name, keyword and/or expiration date (some clip art apparently self-destructs after a certain period of rental time)—up to five parameters at once. So, for example, you could tell Multi-Ad Search to look on two disks for images that have two keywords—*kids* and *dogs*, say, or *kids* or *children*—and

that expire before a certain date. You can list the files that are found by name, or view thumbnails of them.

very good feature

Multi-Ad Search has two significant weaknesses—it can't do file conversions and it can't export less than a complete image. Still, it does a good job of organizing and cataloging lots of images, and it's the only one of these three programs that doesn't use an enormous amount of disk space.

✎ *Mariah* (SS)

very good feature

Symmetry's Mariah ($150) can organize more than just graphics; it can also store sounds, text-only files and animation sequences (in PICS format). In fact, if you have a Mac with a microphone (or a MacRecorder), you can record sounds directly into Mariah.

Mariah can also convert files among several major graphic formats, and its marquee and lasso tools let you select all or part of a graphic and paste it into another application. Its search function lets you look for three different parameters simultaneously.

✎ *PictureBook+ 1.0* (SS)

very good feature

Loop Software's PictureBook+ ($130) has the most versatile editing tools of these three products. It can crop, resize and select portions of a graphic, and it can do some text editing. Even better, PictureBook can convert *anything*—a laid-out page, a spreadsheet, a table—to PICT format and archive it. The program handles bitmapped, PICT, TIFF and EPS formats, and text files. As with Mariah, PictureBook+'s catalog takes approximately the same disk space as the images it contains.

PictureBook+ lets you sort cataloged images by name, date, size or kind—or you can rearrange them by hand. Each graphic has a comment box (a lot like the one in Get Info) into which you can put a description, keywords, details of how the image was created or anything else you like. PictureBook+ only lets you search for words and

phrases in the comment box, and only one at a time. So if you wanted to find EPS files that have desert flora in them, say, you couldn't do that in one pass. And to sort images by file format, you'd have to type the name of the file format into the comment box of each image.

Screen savers and capture programs

screen savers (AN)

mostly for beginners

Most computer monitors (like most TVs) are cathode ray tubes. They're coated on the inside with phosphor that glows when a beam of electrons hits it, creating the image on the screen. Leaving the same image on the screen for a long period of time can exhaust the phosphor in certain areas, causing it to shine less brightly, or not at all. That's where *screen savers* (also called *screen blankers)* come in.

They keep track of how long it's been since you hit a key or the mouse button and automatically black out the screen after a certain amount of time (which you specify). Hitting any key or moving the mouse brings back the image that was there before the screen saver kicked in.

You can turn most screen savers on immediately—the *Sleep Now* feature—by moving the pointer to a particular corner of the screen, which is useful when you're working on something you don't want everybody to see. And you can temporarily turn most screen savers off as well—the *Never Sleep* feature—by moving the pointer to a different corner of the screen, as you might want to do if you needed to watch something on the screen but weren't going to touch your keyboard or mouse for a while.

Today's screen savers don't merely black out the screen—they put moving images on it. And what images

they are! Just as Greek drama arose out of religious choruses, so a whole new art form is rising out of the pedestrian task of protecting the phosphor on monitors. There are times when I sit hypnotized by my screen saver, unable to move the mouse to get back to work. And I'm sure the best is yet to come.

Pyro *(SA/ND)*

Fifth Generation Systems' Pyro ($40) was the first really popular screen saver on the Mac. Its name comes from *pyrotechnics*, which means *fireworks*, because that's what the original module looked like. Version 4 gives you a choice of nine other modules as well.

After Dark *(KF/AN)*

Berkeley Systems' After Dark ($50) has become the most popular screen saver on the Mac, and no wonder. It offers more than 30 great modules—everything from fractals and electronic mandalas to tropical fish and flying toasters (these last even come with sound effects). If that's not enough, a $40 sequel, More After Dark, contains 26 additional modules, and more are on the way.

Still not satisfied? Well, you can create your own screen pattern, by importing a graphic or by writing a message. (There's even a book about After Dark, called—quite cleverly, we think—*Art of Darkness*. It comes with a disk that contains nine special modules of its own.)

If you don't like other people messing with your Mac, After Dark offers a feature called Anti-Snoop Sleep. Once you invoke it, your screen can't be reactivated until you key in a password. If someone tries to turn the screen saver off, by hitting a key or moving the mouse, the screen freezes for about ten seconds and then a password box appears. If the correct password isn't entered, the screen saver resumes until the next time someone tries to deactivate it.

You can't turn off After Dark's Never Sleep corner without also turning off its Sleep Now corner. This is annoying, since it's easy to accidentally leave the pointer in the Never Sleep corner, thus defeating the whole purpose of having a screen saver.

Moiré *(ND)*

This screen blanker extension puts—you guessed it—a moiré pattern on your screen. It's $10 shareware from John Lim and is included on *The Macintosh Bible Software Disks.*

capturing screens *(SA/ND)*

Sometimes you need a picture of something on the screen to include in a document. The Mac's basic command for this function, Shift⌘3, saves an image of the entire screen image in a TeachText document, but it only works on black-and-white screens, and you can't take a picture of *part* of the screen, or of an opened menu. Fortunately, third-party screen capture programs overcome all these limitations, and then some.

Capture *(SA/ND)*

Capture ($130 list, from Mainstay) is a control panel that can take a shot of the screen even when menus are down and dialog boxes are open. You can also set it to postpone the capture for a specified time while you prepare your subject (like the timer on a camera). When you call it up, the pointer changes to crosshairs—you then drag a selection rectangle around whatever part of the screen you want to capture. It can save the screen shot in paint, PICT, TIFF 4 or TIFF 5 format, and can send it directly to the Clipboard or Scrapbook.

SnapJot *(SS)*

I think Wildflower Software's $60 SnapJot is the best of the screen capture utilities. It works in color or black-and-white, and can convert the former to the latter. It works

with more than one monitor at a time, and it can copy almost any screen image, including pull-down menus and open dialog boxes. You can place each screen shot in a pop-up window and keep it on-screen (so if you're writing about it, you can describe it from life rather than from memory).

shortcut

Like Capture, SnapJot can copy a captured image directly to the Clipboard, but you only have a choice of two formats to save it in—PICT or paint. SnapJot can also automatically save images in the format of your favorite graphics program (as long as the application can read paint or PICT files). Then, when you open the screen shots, they launch the application too, and you're ready to edit.

Exposure (SA)

Baseline Publishing's Exposure Pro ($140) is a super-duper screen-capture utility; when you use it, an *image* of the screen (including any open menus or dialog boxes) fills the screen (you think your program or the desktop is still there, but it's just a picture). Then Exposure gives you a variety of tools with which you can alter the image just about any way you want. There's even a menu cutter that draws a jagged edge at the end of a section of a menu to indicate that there's more to it than you're showing. When you're done editing the screen image, you can send it to the Clipboard, the Scrapbook or a disk file.

very good feature

Macro programs

about macros (AN)

mostly for beginners

A *macro* is a command that incorporates two or more other commands or actions. (The name comes from the idea that macro commands incorporate "micro" commands.) A macro can be as simple as a keyboard equivalent for a

menu command—using ⇧⌘S for *Save*, for example—or so complex that it really amounts to a miniprogram.

Macro programs create macros by recording your keystrokes and/or mouse clicks, or by giving you a sort of pseudo programming language to write them in. Here are reviews of two of the more popular of them.

❦ *QuicKeys* (AN)

I've used CE Software's QuicKeys ($150) macro-creating control panel for years to generate "dumb quotes" (described in Chapter 9) and to create keyboard equivalents for menu commands. It's performed flawlessly, and I've gotten so I can barely work without it (as I realized when I switched to System 7 and didn't have a compatible version of QuicKeys for a few days).

I found earlier versions of QuicKeys a bit complex and hard-to-use, but the current version, QuicKeys 2.1, is pretty intuitive. I don't doubt that there are more powerful macro programs around, but I don't use 10% of QuicKeys' power and neither will most Mac users.

With QuicKeys, you also get DialogKeys, which gives you keyboard equivalents for buttons and checkboxes in dialog boxes. Both QuicKeys and Tempo (reviewed in the next entry) can send and receive Apple Events (which are described in the entry on System 7 features in Chapter 4).

❦ *Tempo* (SA/ND)

Tempo II Plus ($180 list, from Affinity Microsystems) is the most powerful macro utility you can get (short of UserLand's Frontier, which is more like a programming environment). It lets you record mouse moves relative to the window or to the screen—so if you record a click in a zoom box, it will still play back in the zoom box no matter where the window is when you use the macro. You can chain macros together; repeat a macro a specified number of times; play back a macro at a specific time, repeatedly

for a specific interval, at a specified speed, or at the actual speed at which you recorded it; and branch from one macro to another, based on what's on the screen or in a file. There's also a macro editor, which makes it easy to scroll and modify the macros.

By the time you read this, there will be a low-end version, TempoEZ, that includes all of the Tempo II Plus features except conditional branching.

Security and protection software

protection schemes *(SA/AN)*

Computer security isn't about preventing the theft of computer equipment—it's about preventing the theft (or destruction) of *information*. There are a number of approaches to doing that, and which one you use depends on things like how private you want your files to be, and whether you're just trying to protect them from a casual looker or from a sophisticated software pirate who really wants to get at them. Two of the most common are simple password protection and encryption.

With *password protection*, you can't open a particular file, folder or disk unless you know its password. There can be *levels* of password protection—you can restrict access or just restrict privileges (look but don't change, make changes only on a copy, change but don't copy, etc.).

File encryption is the most secure—and also the most dangerous—protection scheme. Encrypted files get scrambled, so that the computer can't make any sense out of them—and it takes the right password to unscramble it. That means if you forget the password, you can forget the file—even the best hacker, or the people who make the encryption schemes, won't be able to recover it for you.

If you use encryption, make sure your password is written down somewhere and that at least one other person knows where it is. (This is no joke. Sharon knew of someone who died and took his password with him—his employers needed, but never recovered, his encrypted files.)

Keep in mind that, as a general rule, the more secure your files are, the more inconvenient they'll be for *you* to use as well—so, for your own sake, avoid overkill.

security software tips *(SS)*

Here are a few tips you may find helpful when working with security software:

- As the last entry pointed out (it's worth repeating), it's easy to be cavalier when assigning new passwords and create so many you lose track of them. Remember—if you forget the password, you can kiss the file goodbye.
- If you work with files as a set, use a password for the whole set, and only use an additional password for the extremely sensitive documents inside it.
- Don't use obvious passwords. One company I worked for used everyone's first names as their passwords into the accounting system. (That's a hard one to crack, huh?)
- Unless there's a cryptographer in your office or you're required by contract to use the DES encryption standard, use the fast encryption method for most files.
- Remember to lock all files whenever you leave your Mac.

Citadel with Shredder *(SS)*

Microcom seems to have thought of everything in its $150 Citadel package. The various DA's, extensions, control panels and stand-alone programs let you lock hard disks and removable tapes or cartridges, prevent people from using your floppy drive, encrypt files (you can choose among three levels of DES encryption), invoke a password-protected screen saver and scan disks for viruses.

Citadel lets you create password-protected folders called *vaults* where you can deposit sensitive files (and encrypt them too, if necessary). You can "shred" sensitive documents by overwriting them with zeroes.

Citadel has only two weaknesses. First, every password must be at least eight characters long—that makes them tougher to guess, but also tougher to remember. (If you forget a password, you can use one of the Citadel disks to regain access, but that means you have to be careful about where you leave the disk.) Second, encrypted files aren't listed in Open dialog boxes; you have to use Citadel to move the files to the desktop and then move them back into the vault after you're finished working on them, which is inconvenient.

FolderBolt *(SS)*

Not everyone requires high-level encryption or the other extreme measures that security programs like Citadel offer. Those with simpler needs can easily be served by Kent•Marsh's FolderBolt ($160). As you might guess from its name, FolderBolt protects the contents of folders. You can make it *read-only* (anyone can look inside, but you need the password to change anything), *drop* (anyone can put files in, but you need a password to see or read them) or *password-protected* (you need a password to get to do anything at all with the folder).

What's special about FolderBolt is its flexibility—virtually everything can be configured to your preference. You can have FolderBolt automatically relock all folders whenever you shut down, or designate several bolted folders as belonging to a set, allowing you to deal collectively with them at startup or shutdown. If you decide later that you want encryption, Kent•Marsh sells an EncryptInit that works hand-in-hand with FolderBolt.

A few cautions: Although FolderBolt's protection is milder than other security programs, it can still interfere

with other things you want to do, like file recovery or backups—which will skip over protected folders because they can't be copied. Also, DiskTop can circumvent FolderBolt's read-only folders and make copies of items within them.

Like Citadel, FolderBolt lets you use a disk to unlock a system whose password you forget. Although FolderBolt works well under System 6.0.4 and higher, it works best with System 7.

Complete Delete *(CR)*

When you put a file in the Trash, or use a standard delete command from inside a program, you only remove the file's directory listing from the disk—the file is still on the disk, and it can be recovered with an undelete utility like the one in MacTools. Complete Delete is a public-domain program that completely erases a file from the disk, so that there's no way it can be recovered. (Don't confuse this program with Complete Undelete, which is described in the review of 911 Utilities earlier in this chapter.)

Miscellaneous utilities

Sav-O-Matic *(AN)*

When you get wrapped up in your work, you're going to forget to save—and that means you are going to lose work. This $20 shareware program by Bruce Partridge performs an essential function—periodically (you choose how often), no matter what you're doing, it saves the file you're working on. (You choose the programs it does that within, although there are a few it won't work with, including MacPaint and UltraPaint.)

Since I've been saving my work automatically, crashes hold no terror for me. I just get curious about whether I was unlucky and will have to reconstruct nine minutes

worth of work, or whether I was lucky and will only have to reconstruct two. (Sav-O-Matic—don't you love those '50s retro names?—is included on *The Macintosh Bible Software Disks.*)

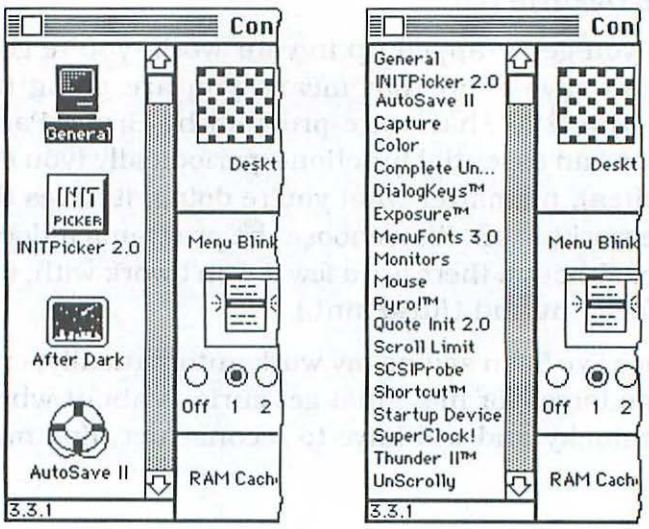
❦ *Scroll Limit* (SA/ND)

One problem with faster Macs is that the lists in list boxes scroll by too fast. Well, there's a great freeware extension called Scroll Limit that lets you control that.

[This is a great idea, but the rate you pick controls the scroll bars as well. I want the lists in list boxes to scroll by fairly slowly, but I want scroll bars to go as fast as possible. The way Scroll Limit is set up, you have to compromise between the two.—AN]

❦ *UnScrolly* (SA/ND/AN)

If you're determined to stick with System 6, you'll need UnScrolly, a nifty freeware utility by Frédéric Miserey (he's famous for his big parties; the guy just loves company). UnScrolly lets you choose between seeing icons or text on the left side of the Control Panel. (If you have lots of cdevs, this is a must.) Here's how the Control Panel looks, before and after UnScrolly:



Stepping Out *(SS/ND)*

If you've been drooling over large-screen displays but can't justify their cost, here's Berkeley Systems' $100 alternative. Stepping Out makes the standard Mac screen act like a window onto a big screen (when you move the pointer to the edge of the screen, the view automatically scrolls over). Because the size of the "screen" is limited only by how much memory there is, Stepping Out can even help people with big screens work on documents that are even bigger—engineering or architectural drawings, tabloid layouts, posters, giant charts, etc.

You can choose from a variety of preprogrammed "screen" sizes, or create and save custom-sized ones of your own. Within each "screen," you can view at 2–16 times its original size or at 25%, 50% or 75% reductions. This makes Stepping Out helpful for people with poor eyesight. They can magnify a document until it's legible, then move the Mac screen around over the "big type" document, as if the Mac were a big clunky magnifying glass.

Although extremely handy, Stepping Out takes getting used to. For example, if you're in the Finder and use the control panel to turn off Stepping Out, your disk icons will occasionally be stranded somewhere off-screen. To get to them, you'll have to reactivate the program temporarily.

Also, zooming icons open or closed occurs in slow motion when you're working on a very large "screen." Finally, be aware that it takes a fair amount of RAM to emulate a big screen—from 100K for the simplest to over 600K for a 3' x 2' blueprint layout. And that's just for black-and-white.

Stepping Out can be more of a hindrance than a help in certain programs. For example, PageMaker's tool palette disappears from the screen when you scroll, rulers either disappear or don't adjust as you scroll, and the popular *Fit in window* command is rendered useless.

✒ SuperClock! *(Chris Allen)*

SuperClock! is a control panel that puts a small clock on the right side of your menu bar. It has a number of customizable features including a timer with an alarm and the ability to sound on the hour. SuperClock! was written by Steve Christenson and is freeware—but if you like the program and want to pay something for it, Steve asks that you send a donation to Packard Children's Hospital at Stanford (the address is in Appendix B). SuperClock! is included on *The Macintosh Bible Software Disks*.

✒ Snooper *(SS)*

Most people leave hardware troubleshooting to the professionals, but Maxa's Snooper makes Mac II hardware diagnosis tools available to anyone. Snooper comes in two versions: software only ($230) and software plus a NuBus card and an array of indicator lights ($300). The card can detect flawed NuBus cards, failing power supplies and defective motherboards. The lighting panel indicates the health of the Mac's three regulatory voltages, the NuBus clock, bus activity, ADB power and ADB data.

Snooper software runs extended tests of the Mac's CPU, keyboard, mouse, SCSI chain, internal floppy drive, modem and printer ports and the system clock. (You can leave it running overnight and get the results in the morning.) It can also check sound and video circuitry, hard disks, RAM, PRAM and the accuracy of the internal clock, and you can perform tests that compare your Mac's performance against a Quadra 900, IIci, SE/30 or Classic (run them periodically to check for degradation over time).

If it finds a problem, Snooper doesn't tell you which part needs to be replaced, but it does point you toward the probable cause and suggest what to do next (many times you have to judge whether there's anything serious enough to fix). Corrupt System software can cause wildly incorrect diagnoses. If there's any question about your System

file's state of health, replace it *before* running Snooper. Also, halt Snooper's software tests before performing other diagnostics, or you might get misleading reports of serious errors.

Help! *(SS)*

Help! ($150 from Teknosys) scans your hard disks and generates an exhaustive report of what it finds: incompatibilities, duplicate files, damaged files and improperly installed extensions or control panels. Help! also gives details about your CPU; the contents of the System Folder; installed fonts, DAs and drivers, and any attached SCSI devices and expansion cards. It lists all applications on each drive.

Help! can check your Mac for problems as if you were using a *different* version of System software. If you're thinking of upgrading to System 7, you can find out what the consequences might be—in more detail than with Apple's Compatibility Checker. If you get Help!, also buy the update service ($75 per year). If you don't keep its huge database of vendor-verified incompatibilities current, Help! loses its helpfulness.

Last Resort *(JK)*

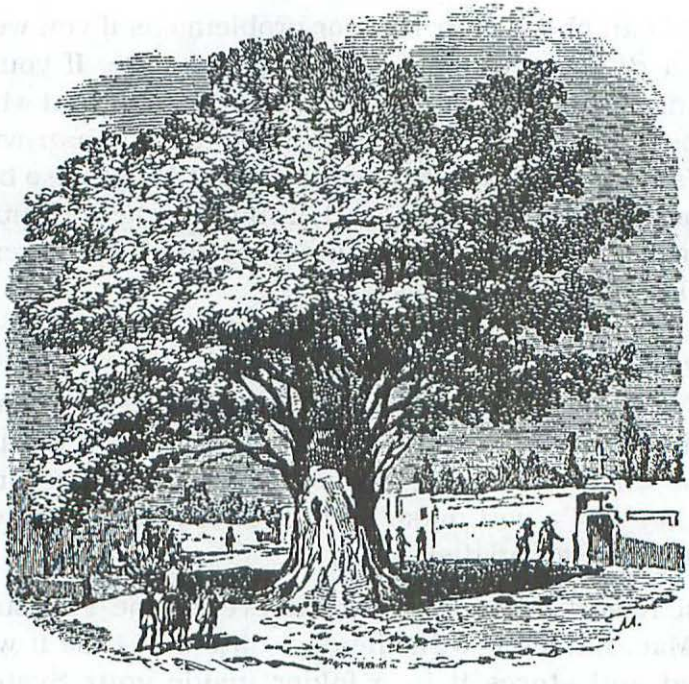
If you've ever accidentally deleted text or files that you'd slaved over, Last Resort ($50, from Working Software) may be what you need. It's a control panel that records every keystroke you make and saves them all in a text file on your startup disk.

Last Resort creates a new file every time you start your Mac, names it with the day, date and time it was created and stores it in a folder inside your System Folder. So if you need to retrieve something you typed up days, weeks or months ago—whether or not you ever saved it—you just open the Last Resort file from that date, using any word processor.

Last Resort files can't replace backups, though. And since the program blindly records all keystrokes, including backspaces, it takes some editing to reconstruct a file from the keystrokes used to create it. For example, here's the text file for this sentence, including typos that I backspaced over (which show up as missing-character boxes on the screen):

> For example, here's the text file fro or this set ntence, including typose that I backspaced over:

As their next task, Last Resort's developers should design a companion program to convert its keystroke files into edited text, which would make this utility even more valuable.



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Chapter 8

Trouble-shooting

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Trouble on the Mac

about this chapter (AN/LA)

No matter how careful you are with your Macintosh, one day something will go wrong. This section describes some of the unpleasant possibilities; the next two sections—*Virus protection* and *Avoiding (and preparing for) trouble*—recommend ways to avoid trouble for as long as possible; and the last two sections—*Common problems* and *Problems with disks*—tell you what to do when trouble occurs. (For a much more comprehensive treatment of all this, check out *The Macintosh Bible "What Do I Do Now?" Book* by Charles Rubin.)

what can go wrong (LA/ND/AN/SA)

Problems can arise because of malfunctioning software, hardware or a combination of the two, but software is the problem most of the time. The most common symptoms of software problems fall into three general categories—*failure notifications*, *error messages* and *crashes*.

When the only problem is that the Mac can't do what you've asked it to do, it generates a *failure notification*—an alert box that tells you what went wrong (perhaps a file can't be opened because it's already in use, or a printer can't be found). Such situations are handled adroitly by the Mac; you simply click the *OK* button to let the Mac know you've seen the alert box, and you can continue to work.

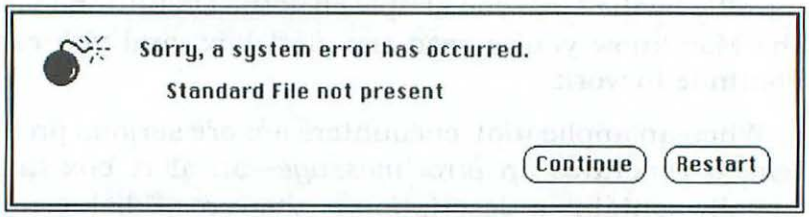
When an application encounters a more serious problem, it generates an *error message*—an alert box that usually contains a description of the error ("disk error; unable to read file," for instance) and a numerical code. Sometimes the message gives you a clue about what's wrong, and sometimes not. As with the failure notification box, you simply click *OK* to tell the Mac to move on.

Sometimes when you click the *OK* button, you crash (described in the next paragraph), because the Mac is hopelessly confused by unexecutable commands.

Crashes are the most serious category; they typically stop the Mac in its tracks. Some crashes fill the screen with dots, strange patterns or garbage characters; sometimes the Mac makes a noise like a muted machine gun. (If you're really lucky, you get both together.) Some crashes are so dramatic that it's hard to believe that software, not hardware, is causing the problem.

There's another type of crash that's quiet; in a *hang* (or *freeze*), the screen looks OK but the pointer won't move (or disappears entirely), or input from the keyboard is ignored, or both. Usually you have to hit the *reset* button on the programmer's switch to get out of a hang, but first hit ⌘S; if the Mac is still listening to the keyboard, that might save your work.

Another common type of crash is a *system error* or *bomb*. You get an alert box (like the one below) that identifies the error with a brief—and often cryptic—description, and sometimes with an ID number. (Even if the message is comprehensible, it may be misleading, because if the Mac knew what it was doing, it wouldn't be having a system error.) The message may also name the program that produced the system error.



Bomb messages often give you the option to *Continue* or *Restart*. If you click *Continue*, the Mac attempts—usually futilely—to return you to the Finder. If you click

Restart, the Mac usually reboots. Sometimes bombs also involve hangs, so you won't be able to push the on-screen buttons and will have to resort to the *reset* button on the programmer's switch.

When you're running System 7 (or MultiFinder in System 6), you're less likely to see a bomb alert box; instead, you'll get an alert box that says: *The application [application name] has unexpectedly quit.* (The Mac brooks no nonsense; if it doesn't like how an application is behaving—blam, that application is *history.)*

Data, or the medium on which it's stored, can also become *corrupted.* This can be caused by a physical flaw on a disk, by bugs or by damaged ("corrupted") software. Sometimes just a single document is scrambled—which is no big deal if you back up regularly. But sometimes the file that's damaged is one that performs vital functions, like one of the directories for your hard disk (if you lose that data, your Mac might not be able to find *anything* on the disk). That's where file recovery utilities come in, as described below in the section on disk problems.

bugs and incompatibilities *(LA)*

mostly for beginners

A bug is a mistake in how a program was written, and can only be fixed by rewriting part of the program (which is called *patching* it). Minor bugs may be virtually harmless; others can be *fatal.*

A bug that only shows up when two or more programs are running simultaneously is called an *incompatibility.* It may result from a bug in one or both of the programs, but sometimes they're incompatible simply because there's not enough memory for both to run. It's difficult, if not impossible, to tell a bug from an incompatibility by looking at the symptoms. (It's also tough to tell it from a problem caused by corrupted files or viruses—described below.)

When you discover what you think is a bug, call the software publisher. If the publisher can't help, you may

choose to work around the bug (which isn't so bad if the bug only shows up when you use a nonessential function of the program). Or you may have to stop using the program altogether until it's fixed. Incompatibilities you can generally handle by not running the incompatible programs at the same time.

Virus protection

viruses *(SA/LA/AN)*

A *virus* is a program that functions on your computer without your consent. A benign virus may do nothing more than duplicate itself—although even that can screw things up if it gets out of hand. Some viruses, however, are *meant* to destroy data—anything from a single file to an entire network. Luckily, few of the known Mac viruses so far have been designed to purposely destroy data.

[Unlike (most) viruses that infect human beings, computer viruses are always created by some emotionally stunted little nerd whose interpersonal skills are so weak that he (I can't prove it, but I bet it's almost always a he) thinks it's amusing to cause other people pain—just to prove he can do it. There's really only a difference of degree between creating computer viruses and creating biological ones, and no doubt little difference in personality between the puerile misfits who make computer viruses and the moral zeros who engage in biological warfare. (It is, of course, possible to create computer viruses for moral purposes, but even if you're on the side of the angels, this sort of sabotage does virtually nothing to sway public opinion, which is ultimately what you have to do if you want the changes you're seeking to last.)—AN]

You get a virus by using an infected program or disk—that is, one that already has the virus on it—sometimes over a network, from an infected network server. Symptoms

of infection vary widely—you may get unexplained beeping, lots of crashes, or files that disappear or become corrupted (although all of these symptoms are caused by other things more often than they're caused by viruses).

antivirus software *(SA/LA/AN/ND)*

Antivirus programs work as *detectors* (letting you know you're infected), *eradicators* (getting rid of viruses) and/or as *preventers* (screening inserted disks for viruses and ejecting them if they contain any). Just as in the world of medicine, it's a game of leapfrog—the viruses evolve to outwit the cures and the cures get more sophisticated to handle the new viruses. Still, a good antivirus program (like those described below) will protect you from most viruses, and will eradicate any you already have.

Disinfectant is a terrific program generously made available for free by its author, John Norstad (and/or his employer, Northwestern University; we're not sure exactly who to thank, since some of the program was a collaborative effort). Disinfectant even offers protection against mutant strains of the known viruses (although, as of this writing, there are apparently a couple of viruses it can't handle). It's simple to use, doesn't intrude (unless it finds a virus you don't even know is there) and even has a mode that handles multiple floppy disks automatically—when one is cleaned and ejected, you just insert the next. This is a product that can't be praised highly enough. It's widely available from user groups and online services and it's updated promptly as new viruses are discovered.

John Norstad also recommends Chris Johnson's Gatekeeper, because it can protect against previously unknown viruses. But it's buggy and may tell you there's a virus when there isn't. Another popular shareware virus program is Jeffrey Shulman's VirusDetective. Symantec's SAM and Microseeds' Rival are more sophisticated, commercial antivirus programs which can, for example,

prevent unauthorized users from turning them off or changing their level of protection, but that's more than the typical user needs.

Some people use more than one antivirus program, with the idea that that will give them better protection. In fact, it's rarely beneficial, takes up extra memory and slows down startup (and perhaps launching programs). What's more, two (or more) programs can get in each other's way. So whatever program you pick, use just that.

Macworld runs a monthly virus update in its news section. If it (or your user group) tells you a new virus is making the rounds, get an update to your antivirus software, run it again on all your disks and install the protection against the new virus. (Often you can just download the update from a bulletin board, or get a copy from a user group.) Remember—you can only control viruses if you update your software frequently. No antivirus program can protect you from a virus it doesn't know about.

simple virus protection for floppies *(SA/LA/AN)*

If your hard disk is infected and you don't know it, the infection can be easily passed to any unlocked floppy disk you insert in your Mac. To prevent this from happening, simply lock the floppy (by sliding the little plastic tab so you can see through the disk). You should keep your master floppy disks (the ones your software came on) locked in any case, since you should never change the information on them. If your *data* disks get around—as you move back and forth between work and home, say—only unlock them when you're writing to them from your own machine.

Avoiding (and preparing for) trouble

avoiding hardware trouble (AN)

For tips on how to set up your Mac to avoid the slings and arrows of outrageous fortune, see the section in Chapter 2 called *Protecting your Mac.*

habits to make second nature (LA)

Here are some good habits to get into; they'll save you lots of problems:

- If your machine crashes while you're working, chances are you'll only be able to recover the data you already saved—so save your work frequently and make at least one backup copy of every document. *[I make at least two backups, so when I'm working on a document, I have four copies of it—the one in memory, the one that's automatically saved (every ten minutes or 200 keystrokes) to my main hard disk, and two copies that I saved to other disks at the end of the last work session. You may think that's overkill, but it only takes a few seconds and can save you many hours of work. Disks go bad, files get corrupted, and one backup is sometimes not enough, especially if you decide you want to go back to an earlier version of a document.—AN]*

- Always shut down by selecting *Shut Down* from the Special menu in the Finder; this gives the Mac a chance to tidy up and save important information. You may think you're saving time by turning the power off without shutting down, but that just makes the Mac take even more time when it starts up.

- Always leave a little extra space on every disk. Your Mac may need it when updating the disk's directories (lists of where everything is), and if it doesn't find any, the disk may crash. (Also, some applications need space for invisible files.)

✎ *be discriminating* (LA/ND)

The more extensions you install in your System, the more likelihood there is of an incompatibility among them or with other programs. Some extensions, like virus protection software, are essential, but be selective about the other ones you use. If you load up on all the latest extensions, you're likely to spend more time than you want troubleshooting.

Security programs (described in Chapter 7) can be especially troublesome, because sometimes there's no way around a forgotten password, or one that's been accidentally (or maliciously) changed. Only use a security extension if you really need it, Even if the password isn't a problem, security software makes it more difficult—if not impossible—to recover data if your disk drive ever crashes.

✎ *multiple System files* (LA)

Before version 6.0.5, more than one System file on a hard disk could create lots of problems. If you need two different System versions for some reason, it's best if they're both version 6.0.5 or later. If both are the same version, you can switch between them either by switch-launching (hold down the Option and ⌘ keys and double-click on the icon of the Finder you want to switch to) or by using a utility like Switcher, described in Chapter 4. To switch between System 6 and 7, you must use Switcher or an equivalent.

✎ *handle invisible files with care* (LA)

Some utilities, like ResEdit or DiskTop, let you see invisible files on your disks. As mentioned in Chapter 4, these are often created by the system software or applications, so don't delete any unless you know what you're doing.

✎ *a hard disk first-aid kit* (LA)

What happens if your hard disk fails and the only tools you have for fixing it are on the damaged disk itself? To avoid such a predicament, always keep handy:

- a full set of system floppies
- another startup floppy with SCSI Probe or the equivalent (FWB Hard Disk Toolkit is very powerful, but some inexperienced users have been known to overtweak with it and mess up their hard drives)
- a floppy (preferably, but not necessarily, with its own System) that contains the formatting software for your hard disk, as well as other repair or recovery utilities

Remember to lock all those disks so they can't be accidentally erased or damaged by a floppy drive that isn't working right.

Consider buying at least one utility collection *before* something goes wrong. Utilities like FileSaver (part of Norton Utilities) and Mirror (MacTools Deluxe) keep an ongoing record of your disks' directories and their deleted files. That information helps you to salvage data from a damaged disk or retrieve files accidentally erased. (For details, see Chapter 7.)

know your system *(SA/LA)*

To troubleshoot effectively—and to get help from experts—you need to know your system's vital statistics. Know which version of the System and Finder you're running and be familiar with the rest of your software and hardware setup. How much RAM do you have? If you're running System 7 (or MultiFinder under System 6), how much memory have you allocated to the programs you're running? And so on.

Keep a list of extensions that are in your System. Know the model and size of your hard drive, and what software it's formatted with. Profiler (part of the Now Utilities) or the shareware program Tattle Tale will collect much of this information for you automatically—or you can just keep track of it in a notebook.

follow the instructions *(LA)*

Most software or hardware documentation tells of known bugs, potential problems or incompatibilities with other products (which are especially likely with programs that run behind the scenes, like extensions). There may also be a troubleshooting section that describes typical problems people have with the program, along with simple solutions. Before you start tinkering with new software, read the manual—or at least the setup instructions and the Read Me file (usually found on the installation disk, it reports common troubles, especially those that occur during installation).

floppy disk cautions *(LA)*

Floppy disks are pretty tough, but dust or a misaligned read/write head can make them unusable. So—

- Protect the information on your master or archival disks by locking them.
- Do *not* store disks in the plastic sleeves they usually come in—the sleeves attract dust, which can make the disk unreadable.
- Beware of doubled or loose labels; a label that sticks up too high can jam a disk in the drive.

- Do *not* format 800K floppies as 1.4 meg disks or vice versa (see Chapter 3 for more on this).

who you gonna call? *(LA)*

The best way to avoid panic when things go wrong is to know where you can get help. Keep the phone numbers of publishers' and manufacturers' tech support lines handy. If you have a friend who's particularly knowledgeable about Macs, find out how late (and early) you can call. Even better, join a local user group that provides technical support for members. But first try the troubleshooting guide in the next section.

Common problems

using this troubleshooting guide *(ND/LA)*

This section consists of a guide for solving Mac problems. To use it, first read the next two entries, then find the heading in this section that best describes the type of trouble you're having (it probably will refer you to other entries).

The initial entries cover general common problems, with an emphasis on diagnosis; the later entries are more specific and offer more solutions. If you can't find a solution here, check out *The Macintosh Bible "What Do I Do Now?" Book.*

how to diagnose a problem *(LA/SA/ND/AN)*

mostly for beginners

Any given problem with your Mac can cause a number of symptoms (bombs, hangs, etc.). Conversely, most symptoms can stem from a variety of underlying problems. That's why the key troubleshooting skill is figuring out what's wrong—once you know that, fixing it is usually pretty easy. *[Now there's a general rule if I ever saw one. It applies to just about everything—relationships, car repair, politics, you name it.—AN]*

To diagnose the underlying problem, you have to isolate it. If you just started experiencing the problem, the most recent change to your system (an updated system, say) may be the culprit, so try undoing it. (If it's a new extension you've just added, see *extension incompatibilities* below.) The second question is, *When does the problem occur?* When you start up the Mac? Only with a certain application or document? When you have more than one program running? Only when you try to save or print a file?

You narrow down the source of the trouble by the process of elimination. For example, if you're having a problem with a document, try working with a different document

from the same application. If it works, the original document is probably the culprit. If not, try something from another application. If *that* works, it could be the application. If not, maybe it's the System software or the hard disk. Keep trying to isolate each possible cause so you can test it. Start with the most likely cause, *or* with the one that's easiest to fix (cross your fingers—maybe the easy one will be the one that works.) It's all a question of logically eliminating possibilities—and not panicking. *[Remember—computers aren't smart enough to be illogical.—AN]*

basic hardware tests *(LA)*

First, confirm that the problem you're having is in software, not hardware. Turn everything off, check the cables and connections, and try again.

Make sure that any new cards or SIMMs you've installed are set tightly in their sockets. (On an older Mac, also check that the resister has been clipped or the jumper removed.)

The SIMMs in each bank must be the same size. They can be different sizes in different banks, but if you have trouble after installing them, try switching the ones in the front bank with those in the rear. (With most—but not all—Macs, the larger SIMMs go in the back. If the SIMMs are in the wrong banks, you'll probably see a checkerboard pattern on the screen.)

If the RAM is improperly installed in some other way, or if the chips are damaged, you'll probably see a sad Mac icon (described below). Power users might also want to check out the review of Snooper in Chapter 7.

problems at startup *(LA)*

mostly for beginners

When you turn on your Mac, this is what should happen:

- you hear a chordlike tone
- the screen turns gray
- you hear the drives being accessed

- you see a happy (smiling) Mac on the screen
- *Welcome to Macintosh* appears on the screen
- you see icons of your extensions as they load (if you have any installed)
- the desktop appears, with the icons and windows where you left them when you last shut down

Here's what to do if that sequence doesn't happen as it should. If you never hear the chordlike tone:

- Check that your Mac is plugged in securely at both ends and that the outlet or power strip is also on (some outlets are controlled by light switches and can be accidentally turned off).
- Try a different outlet, or a different power cable.
- If you have a surge protector, tap the reset button.

If you hear the chordlike tone and the sound of the hard drive spinning but the screen remains black:

- Try turning up the monitor's external brightness control, if your Mac has one.
- With an external monitor, check the connections and cables. If the monitor is driven by a video card, make sure the card is set snugly in place. If it still doesn't work, identify whether the monitor or the Mac is the source of the problem—by attaching a different monitor to the Mac, and/or a different Mac to the monitor.
- Try replacing the monitor driver (you'll need a different startup disk with a clean copy of the monitor driver on it to do that).
- Check for incompatibilities with other extensions (see *extension conflicts* below).
- The monitor may not be connected properly to the Mac. With compact Macs, sometimes a little tap on the side of the case does the trick (this may make it possible for you to keep working, but it's best to have it checked out by a repair person).
- If you have a compact Mac and see a vertical line across the black screen, turn your Mac off *immediately*

and leave it off until it's been repaired. This symptom usually means either a video chip needs to be replaced (a minor repair) or the flyback transformer, part of the power supply, has blown. If it's the power supply, every time you turn on the Mac you could do more harm.

If the screen turns gray but then shows a blinking floppy disk icon with a question mark (as shown below), it means that the Mac is looking for a startup volume—a disk with the system software on it. If you need to get to work right away, try starting up from an emergency startup disk that has SCSI Probe or FWB's Hard Disk Toolkit on it.

Later, when you're ready to troubleshoot, you can figure out why the hard disk didn't start up. It's probably a problem with the system software, but it could be a hard disk problem. (Zapping the PRAM—described in Chapter 2—could solve the problem, if you don't mind losing your general control panel settings.)

If your system hangs during or directly after the happy Mac, or you get a bomb message then, the cause is generally either software or the hard disk. It's more likely to be a disk problem, so that's where to start looking (see *hard disk problems* below).

If this happens before the extensions start loading, suspect a damaged System file and see *corrupted system files* below. If you make it to *Welcome to Macintosh* and your extensions start loading before you crash, see *extension conflicts* below.

If startup is almost finished before you crash (you may even see the desktop briefly), rebuild the desktop before you try anything else. If you haven't upgraded your virus detector recently (or if you—horrors—haven't ever installed

one), it could be a virus. Get the newest version of Disinfectant or VirusDetective and scan your disk for infection.

the sad Mac *(LA)*

The Mac automatically performs a series of tests before starting up. If it passes all of them, it displays the *happy Mac* icon (a little picture of a smiling Mac); if it fails one of them, it displays the *sad Mac* icon (shown below) and a code that describes the problem.

The code consists of two rows of eight digits and is accompanied by a series of tones that indicate (to a trained ear) what the problem is. (On the Mac II and earlier machines, no tones sound; on SE's with 800K drives, Mac Pluses and earlier machines, the code is one row of six digits.)

The most common errors have an *F* as the last digit on the top row (on the older machines, it's the second digit from the left). Fortunately, many of these problems aren't severe. If you get an error code *without* an *F* in that position, it's probably a hardware problem—bad RAM, say—and requires repair.

Here are two common sad Mac codes:

can't load System file into RAM	can't load Finder into RAM
0000000F	0000000F
00000064	00000065
on the Mac Plus and earlier machines:	
0F0064	0F0065

If you get either of those codes, start the computer with a different disk and replace the System and/or Finder on the problem disk. The problem is usually a corrupted file,

and you'll sometimes have to repair the disk before you can replace the System.

The other common error codes that have an *F* in those positions indicate corruption, often of the disk boot blocks or SCSI drivers (see *hard disk problems* and *disk repair and recovery* below). Patient, caring techies sometimes compile lists of all current sad Mac codes and their meanings; look for them on information services or ask your user group.

recovering from crashes *(SA/Leonard Rosenthol/AN/LA/SS)*

When you crash, you usually don't have much choice—you just have to restart. (In System 7, if you crash while you're in an application, try to force the program to quit by holding down Shift Option ⌘ and pressing Esc.) Bombs usually give you a choice of *Restart* and *Continue* buttons, but often the mouse and keyboard also freeze up, so you can't get at either button (and sometimes you can click on them and they don't work anyway). Here's something else to try:

- Press the *interrupt* button (not the *reset* button) on the programmer's switch (or the equivalent keyboard command sequence for your model of Mac).
- You should get a dialog box on the screen with nothing in it but this symbol: > . Now type **SM 0 A9F4** and hit Return. Then type **G 0** and hit Return again. (Those 0's are zeroes by the way, not capital O's.) It's important to put the spaces where indicated, but you don't have to press Shift—anything you type will appear in caps on the screen.
- If you're lucky, the dialog box will disappear and you'll be back on the desktop. Immediately save any open files and check the Clipboard for remnants of the document you were working on when you crashed.

If this doesn't work, just push the *reset* button on the programmer's switch. This always restarts your Mac (unless there's something wrong with the hardware).

crashes or errors while saving (LA)

If you have trouble saving, make sure that the disk you're trying to save to isn't locked. If it's not locked, it may be full or damaged; try saving to a different disk. Because saving is something the application does, try replacing the application from your master disks.

problems with a specific document (LA)

The simplest way to deal with a problem document is to not use it. If you have a backup, use that instead and throw away the troublesome copy. If you don't have a backup, there's still hope:

- If the document is on a floppy, it may be the floppy that's bad—a disk problem often shows up as a problem with a document. Lock the disk, back up the file to another disk and try to open that copy.
- If the problem document is on a hard disk, save a copy of it onto a floppy, in case your repair efforts ruin the original.

- If you can open the document, select its entire contents (with the *Select All* command, if the program has one) and paste them into a new document. If it's a large document, try copying it in sections into smaller new files.
- Use a repair/recovery program (see *disk repair and recovery* below) to see if the document is stored on a bad sector or a corrupted disk. Unfortunately, fixing the disk or recovering the file may not make the document as good as new.
- If the document still eludes you, use a utility like MacTools Deluxe or CanOpener (a great tool that can read a lot of formats) to try to salvage some of it.
- Call tech support for the company that publishes the application. They occasionally have special utilities for recovering damaged documents.

problems with an application *(LA)*

You know there's trouble with an application if you invariably have trouble with all documents created by it. Here's what to do:

- Make sure you're running the current version of the program.
- If the application used to work, and you haven't made any changes in your System, the problem can often be fixed by throwing away the application (including its preferences files) and replacing it with a fresh copy from the master disks the application came on. With some applications, simply throwing away its preferences file may be enough.
- If you're running System 7 (or MultiFinder under System 6), make sure the application is reserving enough memory for itself. (If you're working with big documents, or lots of them, you need more memory than if you're just running one small document.)

  To increase an application's memory, go to the Finder, select the application's icon, hit ⌘I and make sure that the Application Memory Size isn't less than the amount suggested. If it's equal to the amount suggested, try increasing it. (If the application's open, you'll have to close it to do that.)

  Don't set the Application Memory Size *too* high, or you may not leave enough room for other programs to operate properly. You might try moving it up by 256K increments until you stop having problems. *[Or, if you're impatient like me, you can start by doubling it.—AN]*
- If you've recently upgraded your system software to a new version, call the application's publisher to find out which System versions the program is compatible with and whether you need to upgrade it too.
- If you've recently added a new extension or control panel, it may be incompatible with the application. Try removing it and see if that fixes the problem.

extension and control panel conflicts *(LA)*

If you're getting crashes at startup, or one or more of your extensions, control panels or applications doesn't work properly, you may have a damaged System file or a conflict among your extensions (and/or control panels that load at startup; for the purposes of this entry, we'll call both types of files *extensions).*

To isolate the second possibility, disable all extensions by restarting with the Shift key held down. Under System 6, create a new folder and move the System and Finder files—and Desktop Manager, if you're using it—into it. (If you're crashing on startup, you'll need to boot with a floppy to do this.) Then restart. If you still can't start from the drive, see *corrupted system files* below.

To figure out which extension is causing the trouble, create a new folder on your startup drive and move the System and Finder into it. (If you're running System 6, you needn't repeat this step.) The new folder will act as the System Folder while you figure out the problem—it lets you test the extensions selectively.

To pinpoint the source of the problem, move the extensions one at a time from your original System Folder onto the new System Folder's icon, and restart after each addition. If you have a lot of extensions, you can save time by moving all the extensions you absolutely cannot live without (and have used before without problems) into the new folder first. Then add others one or two at a time, restarting each time.

When the problem recurs, start up again with the floppy and remove the last extension you added—that's the culprit (unless there's *another* culprit as well). If you've used the extension without problems before, try installing a fresh copy of it. If there's still a problem, remove all the other extensions but the one you suspect is the culprit from the new System Folder, and restart. If everything runs

smoothly then, the problem isn't with that extension per se; it's just incompatible with one of the other extensions.

Then add the others in turn, restarting each time, until you find the conflict. Remove one of the two, and you should be OK...unless the incompatibilities involve more than the two extensions you've identified.

Extensions load alphabetically. Sometimes you can get around incompatibilities by renaming the troublemakers, to make them load before or after other files. If that doesn't work, you're probably going to have to sacrifice one of the incompatible programs. If you can't bear that, you can switch between them using an extension manager like InitPicker or Extensions Manager (see Chapter 7) or by just pulling one or the other of them out of the Extensions folder in the System Folder when you're not using it. (For help diagnosing incompatibilities, see the review of *Help!* in Chapter 7.)

corrupted system files *(LA)*

If you crash on startup even without any extensions running, your System or Finder may be damaged. Using the Installer to reinstall your System doesn't replace the whole thing, and thus may not fix your problem. It's best to start up from another disk and throw away your old System and Finder (you must also *empty* the Trash under System 7). Then install a new System, either by running the Installer or by dragging a fresh copy from the startup floppy.

Throwing away your System and Finder will get rid of any special fonts or resources (or, in System 6, DAs) that you've added. (In System 7.1, fonts are in their own folder and won't be lost when you replace the System file.) If they're important to you, make copies of them while you're running off the floppy. If replacing your System doesn't solve your problems, the drive may be damaged (see *hard disk problems* below).

random crashes (LA)

Even if things are in pretty good shape on your Mac, the System may bomb or hang once in a while. This may be the result of an extension conflict (see that entry above) or a hard drive problem (see that entry below).

Isolated crashes usually aren't worth the time it takes to investigate them. If you run into a cluster of bombs or hangs, however, look for a cause. Applications that quit "unexpectedly" or bombs with out-of-memory messages (for example, ID=25 or ID=28) could indicate that the Mac doesn't have enough memory to perform all the tasks you're asking of it. This is typical when you have a lot of extensions. To fix the problem, use fewer extensions or applications at once, or get more memory.

If you get out-of-memory messages under System 6, maybe your Mac has enough memory but the System doesn't. If you're a little daring, you can use a utility like BootMan or HeapTool to increase the amount of memory allocated to the "System heap." Tinkering with the System heap can cause bigger problems than you have already, so be sure to read the utility's documentation and/or consult someone knowledgeable.

rebuilding the desktop (LA)

A corrupted desktop can cause many different symptoms:

- Icons may turn into the generic document icon (an empty page with the corner turned down).
- When you double-click on a document, you may be informed that it can't be opened because *The application is busy or missing* (even though it's not).
- Folders open lazily or not at all.
- There's a lot less disk space available than you'd expect.
- Volumes take a long time to mount.
- You see the message *This disk needs minor repairs* when you insert a disk. (If you click *OK*, the Mac rebuilds the desktop.)

You rebuild the desktop to return it to normal. You do that on a hard disk by restarting while holding down Option⌘. For a floppy, hold down Option⌘ and insert the disk. In both cases, click *Yes* when asked if you want to rebuild the desktop. Under System 7, the floppy must contain something—an empty folder will do—before you can rebuild the desktop.

[This is more relevant than it sounds. If you've thrown away everything on a floppy to make room for new stuff, the desktop file may still take up a relatively large amount of space if it has a lot of information about many files it used to contain.—ND]

problems with the screen *(LA)*

Sometimes your screen will look misshapen or a little too small. This may indicate either electrical interference or trouble with the power supply. To eliminate the former, move the monitor away from other monitors or appliances. If that doesn't do it, have a technician look at the monitor.

A blinking screen is another sign of electrical interference, but sometimes blinking is just a normal side effect of the screen refreshing. Some people notice this more than others, and some screens blink more obviously than others, but the blinking shouldn't be very obvious. Severe blinking on compact Macs, especially when the screen actually blacks out for a short time or stays dark until you tap the Mac, may be a sign of a weak connection or a power supply on its last legs. If the blinking is overt or if it worsens, take the equipment to the shop for a look.

On Trinitron color monitors (look for the *Sony* label on the back), you may notice a very fine horizontal line about two-thirds of the way down the screen. That's normal for Trinitrons, part of the technology that makes the picture so sharp.

a jumpy pointer (LA/AN)

A pointer that moves jerkily around the screen is often the result of a loose ADB cable. To check that out, shut down, turn the power off and make sure that the cable from the mouse to the keyboard, as well as both ends of the cable from the keyboard to the Mac, are all attached securely.

There's also an extension that makes the pointer jerk around (some jerk apparently wrote it as an homage to jerkiness), so if a silly friend has messed with your Mac recently, check the System Folder for extensions you don't recognize.

problems with printing (LA)

First, make sure that the right printer is selected in the Chooser. Then check the printer's cables (including the power cord). Next try reinstalling the printer driver. If none of that works, contact the manufacturer to find out about any known incompatibilities between its driver and other software you're running.

If your printer starts madly spitting out random numbers and letters, try zapping the PRAM (as described in Chapter 2).

unrequested General Controls changes (LA)

If the settings on the General Controls control panel (desktop pattern, menu and insertion point blinking) mysteriously return to their defaults, zapping the PRAM may do the trick. If it doesn't, the clock chip (where the PRAM is stored) may need replacement. If you have a Mac Plus with these symptoms and if its clock doesn't keep time, you may need a new battery.

Problems with disks

when the Mac rejects a floppy (LA/SA/DC/AN/ND)

Eventually it happens—you insert a floppy disk with important data in a drive and get one of those dreaded messages: *This is not a Macintosh disk: Do you want to initialize it?* or *This disk is damaged: Do you want to initialize it?* (The answer is no, unless you want to lose all the data on the disk.) When you click *No*, the Mac ejects the disk. Lock it immediately; a misaligned drive or some types of directory damage may cause the Mac to write over your data on an unlocked disk, permanently erasing it.

Here are some things to check out:

- Make sure you haven't inserted a high-density 1.4MB disk in a drive that can read only 400K or 800K disks. If so, put the disk back into a SuperDrive.
- Check that you haven't inserted a high-density disk formatted as 800K into a high-density drive. If you have, put it back into an 800K drive (and see the entry *1.4MB disks initialized as 800K* in Chapter 3 for more information).

- Try the disk in another drive. Sometimes a drive is bad, and sometimes a disk written on by one drive can't be read in another, because the heads are slightly out of alignment. If changing drives works, one of the drives is misaligned or broken. Don't assume, though, that it's the one that can't read the disk. If the disk was created by a misaligned drive, it generally can be read only by that drive. Try the disk in a third or fourth drive to isolate the one with the flaw.
- Wait and try again later. If a disk is too cold or too warm, it might not be read correctly. You can try leaving a cold disk on top of the Mac to warm up for a few minutes.

If nothing does the trick, the disk is damaged. If you don't have a backup, you'll need to repair the disk or

recover the data from it, as described in *recovering data from damaged floppies* below.

Floppies don't turn up bad every day—or at least they shouldn't. If you get a lot of damaged or unreadable floppies, it could be a corrupted System file, but chances are your floppy drive is bad. If you think that may be the case, be sure to back up all your floppies. Lock disks formatted on your bad drive before you use them in other floppy drives, and vice-versa. And have the drive inspected as soon as you can. (Be aware that early PowerBook 140s and 170s had bad floppy drives. If you've got one of those models and have floppy problems, contact your dealer about a fix.)

other floppy disk problems *(LA)*

If a floppy disk won't go into the drive, usually there's a problem with the disk's metal shutter—or the drive could be damaged.

- First make sure there isn't another floppy in the drive (this may sound silly, but it happens).
- Try another floppy. If it works, then the original disk has a problem. Try opening the metal shutter with your finger. If the shutter frees up easily, then try inserting the disk again. If the shutter resists or won't open at all, rip the shutter and spring completely off the plastic case, insert the disk and *immediately* copy everything onto a fresh disk. Then toss the mutilated floppy.

If the disk won't come out of the drive:

- Try restarting while holding the mouse button down. If that fails, you can usually eject the disk manually by pushing a sturdy unbent paper clip in the tiny hole to the right of the drive. Make sure it goes in straight.
- If that doesn't work, the disk may be caught on something inside the drive (possibly the vulnerable drive head), so don't force it. If you can't open the case to figure out what the obstacle is, take it to the shop.

If you hear horrible sounds coming from the floppy drive, try another floppy (but lock it first). If the sounds persist, the drive may need cleaning or repair. If the sound goes away with another floppy, rip the shutter and spring off the disk, copy the contents of the noisy disk to a new floppy and throw the noisy one away.

hard disk problems *(LA)*

If you're having trouble with a hard drive but manage to mount it, skip to *disk repair and recovery* below. (But first, *back it up immediately;* you may never get another chance).

If you can't mount the drive, shut down everything and make sure that all cables are properly connected to the hard disk. If that doesn't help, try using a different SCSI cable (a damaged one can create intermittent problems or keep your drive from mounting).

If *that* doesn't help, try using SCSI Probe or FWB's Hard Disk Toolkit (HDT) to mount the drive. If you've just added a new SCSI device and it doesn't show up in one of these programs:

- you may have failed to give the new device a unique SCSI ID number (see Chapter 3)
- the SCSI chain may have a termination problem (see *SCSI termination problems* below)
- your SCSI devices may have conflicting drivers (see *SCSI driver problems* below)
- the drive may have a hardware problem, like stiction (described below)

If you just upgraded to System 7 or if you have a new Mac, your SCSI drivers may not be compatible with your new system (see *SCSI driver problems* below).

If the entire SCSI chain appears on the SCSI Probe or HDT list but a drive won't mount, or if you get a message indicating that *This disk is not initialized* or *This is not a*

Macintosh disk or *This disk is damaged* (plus, in each case, *Do you want to initialize it?*), or if nothing else suggested here works, see *SCSI driver problems* and *disk repair and recovery*, both below.

Some companies (like DriveSavers) specialize in rescuing drives that can't be repaired, but it's expensive. The technicians take apart the drive and replace broken parts. They can even put the platter into a different drive to try to recover the data from it.

❦ SCSI termination problems *(LA)*

Theoretically, the first and last devices in a SCSI chain—and only those two—must be terminated. In practice, though, the best way to troubleshoot a SCSI chain is to test each device by itself in turn, with and without termination. (You may need to boot from a floppy if your startup drive is disconnected.) If all the devices work alone but not together, you probably have a termination problem (although it could also be conflicting SCSI drivers; see the next entry).

You solve termination problems largely by trial and error. Try adding and removing terminators, keeping in mind that some SCSI devices have internal termination. If you can't figure out a termination scheme that works, try rearranging the order of the SCSI devices. Very long SCSI cables can also act like terminators, so try using shorter ones. On the other hand, if you're using a short cable, try a longer one. (For more on termination, see Chapter 3.)

❦ SCSI driver problems *(LA/AN)*

If you've just added a new SCSI device to a chain and are having problems with any of the devices, contact your dealer or local user group to find out about incompatibilities between the formatting software used on the new device and the drivers for other equipment on the chain. The best way to make hard disk drivers compatible is to

back up all the drives, reformat them all with the same software and then restore their contents.

SCSI drivers can become corrupted, in which case they need to be replaced. To do that, you'll need the software that was originally used to format the drive. If you don't know what formatting software was used and don't know how to find out, do *not* attempt to replace the drivers. *Updating the drivers with the wrong formatting software could trash your disk.* If you have the right software, read the instructions for reinstalling the drivers. (You usually use a command like *Update drivers* or *Reinstall SCSI drivers.)*

Some SCSI driver problems generate a sad Mac icon every time your Mac looks at your drive, whether or not you start up from that drive. If this is the case, starting up with a floppy won't work unless you disconnect the damaged drive or turn it off (and booting with a SCSI device turned off may cause problems for other devices in a chain). This produces a sort of catch-22: you can't boot with the drive on but you can't fix the drive unless it's on.

If you can boot with the problem device off, start up from another disk that contains the formatting software for the errant drive. Launch the formatting software and then turn on the drive. If you're lucky, the software will then recognize the drive. If it does, reinstall the SCSI drivers and see if that fixes the problem.

If you have an internal drive, it can't be turned off while the Mac is on, so you have to open the case and disconnect it before you start up with a floppy, then reconnect it after you launch the formatting software.

We say "you" only in the sense of "one." This is an extremely risky procedure and should be done only as a last-ditch effort by someone experienced with electronics. If the connection isn't made evenly, you may short out your SCSI ports or logic board...or electrocute yourself. If you don't have *total* confidence in what you're doing, take your

Mac into the shop and have them do it. (This is yet another reason not to have an internal drive.)

If your SCSI drivers have been corrupted, other data on the disk may have also been damaged, so if you still have trouble with the drive's contents, see the *disk repair and recovery* entry below.

stiction *(LA)*

If you have intermittent trouble mounting a drive, especially in humid weather, it may be caused by *stiction*—that is, sticking that prevents the disk from spinning properly. Usually this is caused by lubrication gumming up, but sometimes it happens when the read/write head gets stuck on an imperfection on the platter, or dust build-up gets in the way.

If you suspect stiction:

- Back up the disk *immediately,* if possible.
- If you get the drive working, keep it on (if you turn it off, it may never come back to life).
- If the drive won't mount, try switching it on and off several times.
- If none of this works, *as a last resort,* hold the drive in your hands, parallel to the floor, and twist it sharply in a clockwise direction (you're trying to force the platter to spin free). Finally, try slamming it on a table; this may be just what the drive needs (and if it isn't, you get to vent your frustration on a good-for-nothing piece of junk).
- Even if one of these techniques gets the drive to mount, buy a new drive. Stiction only gets worse, and it can't be repaired.

disk repair and recovery *(LA)*

Many disk problems result from corruption of the disk's directories or other files that tell the Mac where to find data. If these files are damaged, the Mac will not only have trouble locating files, it may not even know they're there,

and may save new data on top of them, completely erasing them.

Using a damaged disk can produce a number of symptoms—like files that disappear or unexplained bombs that occur when you try to access the disk. Or you may not be able to mount the disk at all. To save your data, you have two options: *repair* and *recovery*.

Repair utilities use any remaining undamaged directories to reconstruct lost information. (If you've installed a utility like Norton's FileSaver that records directory changes, you have an even better chance of getting your files back.) Successfully repairing a volume may save all your data, though many times not everything survives.

If a disk can't be repaired, you may still be able to get some or all of your data safely off of it with a *recovery* utility, which tries to copy files from it to an undamaged disk.

Here's a series of steps to follow when you have a damaged disk, beginning with the least powerful—and least dangerous—repair utilities (every repair attempt involves some risk, however, because the utilities alter the disk's directories), then proceeding to the bigger guns. (If it's a floppy that's damaged, first see *floppy disk repair and recovery* below.)

- Start repairs with Disk First Aid (it comes free with your system software). Disk First Aid isn't very powerful, but it can fix many common problems, and it almost never creates new ones.
- If Disk First Aid fails, try a more powerful repair utility, like those from Norton Utilities, 911 Utilities or MacTools Deluxe. I always try Norton's Disk Doctor first, because it has the best success rate. (It rarely creates new problems, but when it does, the disk may be in worse shape than when you started.)

- If a repair utility doesn't fix everything the first time, run it several times; sometimes it will fix more damage with

each pass. Or use a different repair utility. The more you try, the better your chances of finding one that works. (One program may get you to some of your lost data, but you may have to keep trying with others to get all of it back. Sometimes one utility paves the way for the next.) As soon as you gain access to any files, back them up. Doing further repairs may lose them again.

- If you can't repair a volume, try a recovery utility like those in Norton Utilities 2.0 (the one in the earlier version isn't nearly as good) and MacTools Deluxe.
- If you have trouble with files retrieved from a damaged disk, see *problems with a specific document* above.

floppy disk repair and recovery *(LA)*

Some utilities, like MacTools' FastCopy, can make exact copies of damaged or unreadable disks; before you attempt any repair on a floppy, you should use one of them, so if something goes wrong with the repair process, you can try again on a fresh copy. (If a disk is badly damaged, these utilities may not work. If that happens with FastCopy, try version 1.0—it's less finicky. Unfortunately, version 1.0 won't work on 1.4MB disks.)

Sometimes merely copying a floppy fixes the problem (or makes repair possible). First try the copy in a drive. If that doesn't work, proceed with repair or recovery (working on the backup copy), as described in the previous entry.

Once you've repaired, recovered or given up on a damaged floppy, it may be possible to reformat it and use it again. But I recommend you throw it away, because a disk that failed once is likely to fail again.

recovering unsaved files *(SA/LA)*

If you crash before saving changes to your file, you may be able to piece some of it back together from the temp files many applications create (usually in the System

Folder). Check the manual or call the publisher's help line to find out how to salvage the data from temp files.

Word, for example, leaves numbered files named *Word temp 1* and so on. To open one of them, hold down Shift, choose *Open Any File...* from the File menu, and double-click on the file.

recovering deleted files *(SA/ND/AN)*

When you empty the Trash, files don't actually get erased from the disk—their names just get erased from the directory. Since the information is still on the disk, you can get it back (until the Mac reuses the space). The sooner you try, the more likely you are to be able to recover it—the longer you wait, the more likely it is that other information will be stored right over the old file.

So as soon as you realize you need something you've deleted, stop using the disk and run a utility, like Norton's UnErase, that can retrieve files you've thrown away. (It's easier to get files back if you've installed a utility like Norton's FileSaver or MacTools' Mirror that keeps track of what you delete from your hard disk.)

Unfortunately, such utilities keep records for every temp or backup file that an application makes and then erases. Applications that make automatic backups particularly clog up these utilities, since every backup is recorded. Because of that problem, make sure you leave the utilties enough room to log the files you'll want to recover, along with all the ones you won't.

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Chapter 9

Word processing

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Word processors

word processing features (AN/SA)

The purpose of *word processing programs* (also called *word processors)* is to let you enter, edit and format text. To do that job well, there are some features that any word processor should have:

- *Headers* and *footers* are pieces of text that automatically print at the top (or bottom) of several pages. You should be able to easily place page numbers into either the header or footer.
- You should be able to specify different margins, headers and footers for *left and right pages.*
- *Leading* lets you vary the spacing between lines independently of the size of the font, in increments of one point or less. (It's pronounced *LEHD-ing,* not *LEED-ing;* in the old days of metal type, the lines were spaced apart with strips of lead.) Leading is an essential feature for all but the most basic documents, so don't buy a word processor that only gives you choices like single-spaced, space-and-a-half and double-spaced.

- *Spelling checkers* go through a file and look for words that aren't on its list of correctly spelled words. If it can't find them on the list, it assumes that they're misspelled and asks if you agree. Since any spelling checker's dictionary is bound to be incomplete, make sure you can add your own words to a user dictionary (and see the entry on *Dictionary Helper* in the spelling checker section at the end of this chapter).
- *Word count* is a very useful feature, and you should be able to do it for just the text you've selected, not merely for the entire document. Most word count utilities also give you the number of characters, paragraphs and lines.
- *Import/export.* What formats a word processor will accept files in, and what formats it's capable of exporting files in, is a very important but often

overlooked feature. Some word processors can take text from just about any other program and give it back just as generously. Others make you jump through hoops to export and import, or only recognize a limited number of formats.

- You should be able to *preview* what your printout will look like on the screen.

Below are some other word processing features that aren't essential for all users but may be just what you need:

- *Page layout* features aren't found only in page layout programs. Many word processors give you drawing tools and most let you place graphics anywhere you want on a page.
- The ability to format in *multiple columns* is very handy if you need it, useless if you don't (although if you have it, you're bound to find a use for it). In most programs, unfortunately, the columns all have to be the same width; to get variable-width columns, you'll probably have to go into a page layout program.
- *Outlining* capabilities are sometimes built into word processors, as is the ability to automatically generate *tables of contents* and *indexes*.
- *Footnotes*. If you need them at all, make sure you can get them in the format you need (on each page, at the end of a document, with repeating numbers, or whatever). Whatever your basic requirements are, don't assume that they're the norm for footnoting.
- Some word processors (Microsoft Word, most prominently) have a feature called *Glossaries*. The name is confusing, since what's referred to isn't the everyday meaning of the word—a list of definitions like the one at the back of this book. These Glossaries—with a capital G—are collections of often-used words, phrases, paragraphs or graphics that you can recall with a keystroke and place in your document. (Sometimes they're called *Libraries*.)
- Styles, which are explained in the next entry, are another very useful feature.

Remember, just because you can get all these features doesn't mean you need them. For example, if most of your word processing is business correspondence, or straightforward manuscripts, you won't need a program that lets you work in multiple columns. It's silly to pay for what you don't need and, almost inevitably, a lot of features you don't need will get in the way of the ones you do.

Styles *(SA/AN)*

A Style is a collection of paragraph and character formats you can apply in one fell swoop to selected text. *(Style* is capitalized to differentiate it from *type styles* like italic and bold. It's really a pain how Microsoft appropriates words that already have meanings, like *style* and *glossary*, and assigns them new, contradictory meanings.)

A *style sheet* is a collection of Styles you use in a particular document, but since you can't capitalize in speech, most people refer to Styles as *style sheets* when talking. Styles were introduced to the Mac by Microsoft Word, and are probably that program's best feature.

If you change a Style, every paragraph defined as that Style changes automatically. For example, let's say that, as Arthur edits this, he's using a Style called *text*, whose definition includes the font **Moulin Rouge** in 18-point. (He makes it 18-point because he's afraid of magnetic radiation from his two-page display—see the *protecting yourself* section of Chapter 2 for more details—and thus sits three feet or so from the screen, which means he needs 18-point type to see what's on it. He uses **Moulin Rouge** because it reminds him of Gay Paree and distracts him from the stupendous drudgery of editing a twelve-hundred-page book; actually, he doesn't really edit in **Moulin Rouge**, but little jokes like that are all that stand between him and hebephrenia.)

In the book itself, however, the text will need to be 11-point Bookman. To make that change, you merely have

to call up the Style called *text* and change the font definition from 18-point Moulin Rouge to 11-point Bookman. Everywhere the *text* Style has been applied, the text will automatically be changed to 11-point Bookman. You won't have to tediously go through the chapter and change the text by hand—being careful to avoid section heads (which are larger than 11-point), tables (which need to be in Optima, not Bookman) and so on.

very good feature

Another advantage of Styles is that they can be based on each other. For example, let's say the entry titles (the lines that begin with an) are in a Style called *entry head;* you've based it on the *text* Style but have removed the indent and added bold italic. If you were to change the definition of the *text* Style to Benguiat instead of Bookman, the entry titles would also change to Benguiat—but remain bold italic and unindented.

very good feature

Another great feature (not available in every program that provides Styles), lets you define whether the next paragraph you type remains the same Style or switches to a new one. For example, the *text* Style doesn't change when you move to the next paragraph, but you could set up the *entry head* Style so that when you press Return after an entry title, you're automatically switched to a Style called *first paragraph*, which is identical to the *text* Style except not indented. And then when you press Return at the end of the first paragraph, you could be automatically switched into the *text* Style.

choosing a word processor *(SA/AN)*

Word processors are the programs most people use most often, so choosing one isn't a decision to be made lightly. Several reviews follow this entry (including five of Microsoft Word, to give you a range of opinions) but you should also check out the reviews in Macintosh magazines (and read the ads too).

Once you find a program that looks interesting, buy or borrow a book about it; it will give you more of an idea what the program can do than any magazine review. Talk to people at a user group and see what they love or hate about their word processors. But keep in mind that nobody's objective, and that most people love the program they're using.

Since nothing can substitute for hands-on experience, see if a local dealer will give you a demonstration of one or more major programs. If not, another good place to try them out is at a service bureau (described in the last section of Chapter 5); they usually have most of the popular programs. Or call the publisher of any program you're interested in to see if they have a demo version of it (or ask a dealer).

Know in advance what features you'll need and focus on whether each program has them. But remember that more important than features is that elusive thing called *feel.*

You can tell yourself this is all too much trouble, but buying a word processor impulsively makes about as much sense as buying a car impulsively; you may do fine, but the odds are you won't be happy.

Word 5—too little, too late? *(HK)*

Word ($400, from Microsoft) is probably the most controversial program on the Macintosh. It's by far the best-selling Mac word processor, but it also has vocal and passionate detractors, and some critics expect this group to grow as Word 5 becomes better known.

There's no question that Word deserves a lot of respect. Its great style sheets are flexible and easy to learn; even before the latest upgrade, they set the standard for other word processors.

Although lots of programs have keyboard commands, Word provides an incredible wealth of them. You can assign (and reassign) them as much you please, and you

can add new ones to the menus (along with rulers and even dialog boxes).

Word provides a variety of views; one shows your document in page layout form, while another is optimized for speedy text editing. Word offers just about every other standard power feature as well, from quick table making and mail merge (which lets you personalize a form letter with information from a database) to table of contents and index generation. Word 5 adds drag-and-drop for moving text—you simply select text and *drag* it to the new location, bypassing the Clipboard entirely.

On the other hand, Word is probably the hardest Mac word processor to learn (it's not *that* hard, but it certainly could be more intuitive), and it still has a number of quirky, backward features that should have been corrected.

To be honest, none of Word's flaws really bothered me in previous versions of the program—I was willing to write them off as inconsequential compared to Word's obvious strengths. But now that I've really studied Word 5 (I wrote a book about it), I'm having second thoughts.

I have a feeling Microsoft isn't wholeheartedly committed to Word for the Mac. When companies have popular programs for both the Mac and the PC, the two versions often leapfrog as they're improved—the Mac version leads the way for a while, and then the next PC version shows it up and then the next Mac version pulls ahead again.

In this case, although it took Microsoft nearly *three years* to update from Word 4, Word 5 for the Mac still doesn't match the features of Word for Windows (which runs on IBM PCs and compatibles). And it corrects only some of Word 4's much-discussed shortcomings.

As for major features, I'm shocked that so little has been done to improve Word's page layout capabilities, especially when programs like Nisus, WordPerfect and the modestly priced Taste have already set a higher standard.

Word 5 claims to have a built-in drawing program, but without group, alignment, grid or ruler features, that's really hyperbole. For more hype, try out Word's new grammar checker. I can't imagine anyone finding this thing useful; it's slow and seems to make an inane suggestion every other sentence. *[Them grammar checkers ain't no good, not a one a them.—AN]* Likewise, Word's new *Border* command, which lets you frame graphics and tables in a variety of styles, is awkward and confusing.

Word 5 *has* made some important improvements. One breakthrough is its new Mail Merge Helper, which lets you set up letter and data documents with an easy-to-use command bar.

There are also refinements I wouldn't want to do without. For instance, Word 5 remembers the last four files you've worked with and lists them on the File menu so you can reopen them quickly. And a super fast *Find File* command rescues documents from a disorganized hard disk in seconds.

Finally, Word 5 has a handy ribbon of command icons that works a lot like the ruler. When you turn it on, the ribbon appears at the top of your document window and lets you select fonts, sizes and styles, set up multiple columns, and create graphics quickly without going to the menus. In addition to its convenience, the ruler brings some features that were hidden in Word 4 out into the open, so it's more likely you'll learn how they work (even if you're not a power user).

Still, after three years, I expected more significant improvements. Although I still use Word all the time, it's no longer the obvious choice for power users; take a careful look at WordPerfect and Nisus before making a decision.

why I like Word *(BB)*

I've been using Word ever since its first release, and I've always found it a good tool. But Word 5 is a *great* tool.

Here's how its features make my life easier, in order of importance:

very good feature

- Word hasn't ever crashed on my system. *[I had a constant problem with Word 4 freezing on my system.—ByB]*
- The Work menu gives me a place to put my most important files and functions for immediate access without struggling with macros. There's nothing like it in any other Mac word processing program, and I wouldn't be without it.
- Style sheets and Stationery have allowed me to create a collection of oft-used documents, intuitively.
- Word's *Find File* command is lightning fast and comprehensive, better than any other file finder I've used.

very good feature

- Word 5's spelling checker is superb. It catches repeated words, almost never misses a misspelling, and doesn't mistakenly flag words that are spelled correctly. And it's fast. *[Maybe on Brad's souped-up Mac, but not on my humble Classic. It went faster after I increased Word's memory allotment, but it's still slower than spell-checking was in Word 4 (although this may not be true in an improved version of the spelling checker that Microsoft will probably have already released by the time you read this).—ND]*
- The thesaurus is quick and extensive.
- Headers, footers and outlines are simple and direct.
- The table editor lets me try out imaginative presentation of material in tabular format. (I only wish the editing techniques were easier to figure out.)

I believe a word processor shouldn't try to be a page layout program, so the absence of powerful drawing tools doesn't bother me. It's enough that I can easily import a graphic element into my written work.

Word 5 isn't perfect, but I've tried Nisus 3 and WordPerfect 2.1 and I wouldn't switch to either. I find Nisus's iconic interface confusing; the symbols don't match my

image of the operations they're supposed to describe. And it's not uniformly faster than Word—in fact, opening documents takes noticeably longer in Nisus. WordPerfect is better for graphics, but I mostly work with words, and Word is better at that than either of these other programs.

**** *why I like Word* (RS)**

Word does everything I need it to do—multiple columns, style sheets, automatic line numbering, suppression of headers and footers for title pages and translation for many other word processors. And now that I've removed the grammar checker, it's plenty fast enough. I respect WriteNow (reviewed below) because it's easy to use, compact and blazingly fast (and its current version has style sheets), but Word has *every* feature I need to quickly turn out documents with complex formatting.

**** *I like Word too* (ND)**

Word captured my loyalty when it introduced Styles way back in Word 3. I resisted learning how to use them—and they resisted being learned—but once I grasped the process, I couldn't imagine working on complex documents without them. Word 5 improves on them with a simplified Style dialog box. It also finally includes a *Select All* command on the File menu—and it has an equation editor and the ability to rotate text.

Remarkably enough, even the initial release of Word 5 seems fairly bug-free, according to my experience and the chatter I've heard on America Online. Not completely bug-free, of course—some people report trouble when attempting to edit the spell checker's dictionary, and to import your custom dictionary from Word 4, you have to open it as a text-only file.

Remember to open and peruse the Read Me file that's on the installation disk; it warns you not to leave Word 4 on the same disk where you install Word 5. (If you prefer

working with familiar Word 4 menus and dialog boxes, you can opt to work in Word 5 with a Word 4 interface.)

As of this writing, Word 5 seems to be incompatible with a few utilities: NowSave (which saves files automatically in the background), SuperClock (a clock that sits on the menu bar) and the antique MacroMaker (as explained under *Word tips*, below). As new versions of these programs come out, however, some of these problems may evaporate.

Word 5—is it almost there? (AN)

Word has always had a lot of wonderful features, and my life would have been a lot simpler if I, like most of the people I deal with, had used it for all my word processing. But I've always felt that Word wasn't very carefully thought through and that it has a very unMaclike feel. (I began using the Mac three weeks after it was introduced and have somewhat purist—oh, all right, rigid—tastes in what the Mac interface should be like.)

To some extent, those criticisms remain true of Word 5. For example, its search-and-replace function still demands that you tell it if you want to *Continue search from beginning of document?*

What I'd like to know is, what's so special about the *beginning* of a document? How often do you only want to search from where you are to the end of a document, rather than search the *whole* document? (It's true, Word 5 lets you specify at the start of a work session that you want all searches to be global, but there's no way to make that preference the default, so you have to repeat it every time you re-enter the program.)

Fortunately, however, many of Word's clunky, ham-handed ways of doing things seem to have been fixed in Word 5. Even the manual, which has traditionally been more trouble to use than it's worth, is *much* better (in my limited look at it). It even has a good index!

Maybe, as Helmut says above, more problems should have been corrected—especially after three years. But Word 5 is very definitely a big step in the right direction.

Susan McCallister, who shared my feeling about Word 4 and earlier versions—namely, that using them was like having a nightmare in which you find yourself in a foreign country where dangers lurk everywhere and no one speaks English—finds Word 5 a vast improvement.

Microsoft's telephone support, which used to be wretched, now seems to be quite good. The one time I called, I got someone immediately (no "unusual volume of calls" that prevented them from answering my call, which was nonetheless "very important" to them) and he knew the answer to my question right away. The whole process, from discovering the problem to solving it, took less than five minutes.

[I've only had to use Word's phone support a few times, but I've had similar experiences. Each time the tech support person was well-informed about the program, articulate, helpful and cheery. And I didn't have to hang on the phone for a long time waiting to reach someone.—ND]

In view of all this, I would have switched over to Word 5 to do this book (or would at least have tried it out), except for one feature that anyone as impetuous (there's a nice euphemism) as me simply can't do without—multiple levels of undo (see the Nisus review below for details).

My fear at leaving that feature behind is why I've stuck with Nisus, even though its publisher has been much slower even than Microsoft in making needed changes to its product. But if Word ever acquires multiple undos (or if I find a third-party utility that provides them), I'll be on Word 5 like a duck on a June bug.

WordPerfect 2 *(HK)*

The first version of WordPerfect for the Mac was dubbed WordImperfect by some people—it was unMaclike, hard

to learn and very slow when you were working with more than one column. Its main virtue was the fact that files created by WordPerfect for the PC transferred into Mac WordPerfect with their formatting intact (and vice-versa).

However, WordPerfect Corporation took all the criticism it received to heart, and made version 2 a real powerhouse. Even though it lists at $500, WordPerfect has even made some longtime Word fans rethink their loyalties.

WordPerfect has always offered high-end features like style sheets, mail merge, graphics, and table of contents and index generation, and made them relatively easy to learn. But WordPerfect 2 includes some major advantages over Word—like easy-to-use macros and a full-powered built-in drawing program.

Compare the two programs' page layout features, for instance—WordPerfect comes out miles ahead. It lets you drag graphics anywhere on your page without selecting *Print Preview* first, as you have to do in Word. And WordPerfect's drawing tools include the *Group* command, which Word lacks.

WordPerfect was also the first word processor to embrace Apple's QuickTime multimedia extensions, which let you paste a video or animation segment into a document. *[How would that print out?—AN]* These guys are really with it.

WriteNow 3 *(SM)*

I've loved WriteNow ($250, from T/Maker) for years because it's fast, reliable, easy to learn, easy to use and takes up so little room on a disk. It has good control over display and page formatting, keystroke commands that are easy to remember, mail merge, footnotes, and all the features you normally use in day-to-day writing. It lets you keep several documents open at once, and you can have as many as four columns (all of the same width).

WriteNow is smart. For example, if you get a *This document was set up for a different printer* dialog box, WriteNow puts a *Page Setup* button right there in the box (saving you the trouble of cancelling printing, going to *Page Setup* and then giving the *Print* command again).

You can control the font size directly from the keyboard. (Most of WriteNow's features have keyboard commands.) WriteNow has dotted lines that extend down the page to help you position margins or tabs. Double-clicking at the top (or bottom) of a page will get you a header (or footer).

Its spelling checker is fast to load, easy to use, makes good suggestions for words it catches and stays open (if you want it to) as a window behind your document(s). There's a 135,000-word spelling dictionary and a 1,400,000-word thesaurus, and you can add to any dictionary by selecting a text file and having the spelling checker "learn" it. It's easy to count words, characters and paragraphs, and as with everything WriteNow does, it's *fast.* Search and replace goes forward, backward and wraps around the document, and can search and replace Tab and Return characters (especially useful for reformatting database files).

In Version 3, T/Maker has added a really great implementation of style sheets *[they're still not as good as Word's—RS]*, an optional extra-fast scrolling speed, support for color and System 7, and the ability to import documents from WordPerfect and Word 4 (including fast-saved ones), as well as other programs. And they've done all that in a program that only takes up 275K!

Most of what I like about WriteNow is what isn't there—problems and barriers. It becomes such a transparent tool, it reminds me of a favorite jacket, the one that has just the right number of pockets in all the right places, and never feels too warm or not warm enough.

✒ *Taste* (Michael Miley)

When DeltaPoint's Taste first came out, I wanted to love it, because it's cheap ($150) and because it combines drawing and basic page-layout tools with a clean, easy-to-use word processor. But the original version was slow, had a shaky redraw and crashed frequently. Version 1.02c has cleaned up its act. While still a bit slow, it's solid.

Taste has character and paragraph styles that can be copied between documents, saved as Stationery and assigned to menus. Headers, footers, footnotes and endnotes can have their own styles. Footnote changes are automatically renumbered.

Taste's Layout mode has visual controls for margins, columns and gutters, which let you design simple newsletters and business forms. Its Draw mode has eight drawing tools, plus rotation, alignment, layering and word-wrap controls. It links to DeltaGraph, its sibling charting program, and can import PICT and EPS graphics.

Taste's built-in address book makes mail merge easy. It has a 117,000-word dictionary, the ability to create a user dictionary, a 1,400,000-entry thesaurus, and a find-and-replace function that can hunt for text attributes.

How do they do all that for such a low price? Do they live in trailers? Taste isn't just a bargain, it feels like theft.

[I liked what I read about this program, and wanted to try it out, but its installation procedures were so cumbersome and poorly documented, I just gave up on it (not that I couldn't have figured it out, but if they make it so hard, why bother?)—AN]

✒ *MacWrite II* (AN)

Many of the people in my office used MacWrite II ($250, from Claris) for years and were quite happy with it. In terms of features, it's been far outdistanced by all of the programs described above, but what's great about it is how intuitive

and easy to learn it is. Here's one example out of many: when you choose the *Insert Header* (or *Insert Footer)* command, a text box opens on the page in the exact position where the header (or footer) will appear. This is so simple, so obvious, so right, and yet no other word processor I know does it that way.

Not everything about MacWrite makes sense. The font menu shows font names in the fonts themselves, which makes it just a bit hard to identify ones like Cairo and Zapf Dingbats. WriteNow has this same "feature," but at least gives you a way to turn it off.

Another thing MacWrite is missing is the ability to customize keyboard commands. Without this feature, you're stuck with whatever choices MacWrite's programmers made, which include ⇧⌘T for the *Plain text* command. (You can, of course, go in with QuicKeys or some other macro program and change things around, but this should really be built into the program, as it is in many other word processors.)

We haven't put a section of MacWrite tips in this edition, partly because a long-promised upgrade (called MacWrite Pro) was still delayed as I wrote this, and partly because MacWrite II has so few hidden or poorly explained features that it doesn't have as much need for tips as other programs.

(Here's one tip we would have put in if we'd had a section: Double-clicking on a word in MacWrite highlights the word, but not the spaces on either side. So if you hit Delete to delete a word, you have to hit it again to delete the remaining extra space. The solution? Use ⇧⌘X instead. It deletes the space to the left of the highlighted word as well.)

I used to have a lot of affection for MacWrite, since it was the first word processor I ever used on the Mac. But by now, on those rare occasions when I need to use it, it

just feels old-fashioned. I hope Claris brings out a new, more competitive version sometime. Whether they do or not, I hope MacWrite's competitors will appropriate some of its extraordinary intuitiveness. It really sets the standard for ease of use.

Nisus 3 *(AN)*

Unlike most computer writers, I'm not fascinated with every new program that comes along. In fact, I'm very conservative about the software and hardware I use; I don't want to spend the time it takes to learn about something unless I'm going to end up using it frequently, and enjoy that use. (Along the same lines, I drove a 1965 Plymouth Valiant for ten years—until it was 24 years old—and spent eighteen months deciding what to replace it with.)

But every once in a while I run across a product whose intelligence of design shines like shafts of sunlight breaking through the clouds. Nisus *(NY-sis)*, $400 from Nisus Software (formerly Paragon Concepts), is one of those programs. (At least some of the time it is—the rest of the time, it's like the clouds rolling in to cover the sun.)

very good feature

Some of Nisus's very intelligent features are listed in Chapter 1, in the *Why don't they all...?* section; there are dozens more. In fact, Nisus has more features I'd like to see made standard parts of the Mac interface than any other program I've ever used. Nisus' telephone support is great and even the manual is pretty good—although, as with virtually every one I see, the index needs some work.

very good feature

My favorite feature in Nisus is multiple undos. Because at my back I always hear time's wingèd chariot hurrying near, I tend to work pretty quickly (not to say frantically) and often make a mistake and then immediately type something else (or give another command). In most programs, this means that the text I *really* want to recover is lost; all I can recover is what I did *after* I made the mistake.

For example, more than once I've accidentally hit some combination of keys that selected the entire document I was working on (not ⌘A, but some other weird combination). Then the next character I typed was substituted for the entire document.

If you don't immediately hit ⌘Z in a situation like that, you stand to lose all your changes since the last time you saved. But with Nisus, you can *always* recover the text you really want, because it gives you *32,767 levels of undo.* This, I admit, is overkill; even I seldom make more than 10,000 mistakes in a row. But *every* Mac program should have at least ten or twenty levels of undo.

Nisus has other wonderful safety features. It lets you automatically save after any number of keystrokes you specify (I usually pick 100 or 250, depending on how long the document is and therefore how much of an interruption saving it will be). This approach is *much* better than saving after a certain period of time (ten minutes, say), which might be way too seldom if you're working furiously away, but way too often if you've walked away from the computer to have lunch or run an errand.

You can also tell Nisus to make automatic backups of each file, so if the current one gets screwed up and then saved, you still have the one from 100—or 250, or however many—keystrokes back. (You should *always* choose automatic backup files in any program that offers them.) Nisus will even automatically make a second backup on another disk!

One nice feature of Nisus's is *noncontiguous selection.* It lets you select separate, disconnected pieces of text, as many as you want, and then do the same thing to them all at once (change them all to bold, say, or change the font, or cut and paste them as a unit).

You can use as many as three character keys after the modifier keys (⌘, Shift, Option, etc.), and thus create

keyboard commands like, say, Shift Option ⌘ S C R. This gives you up to 125,000 possible key combinations (Nisus's programmers seem to revel in overkill).

Nisus also lets you place independent text blocks or graphics anywhere you want on the page, as you can in a page layout program (but what you're placing are actually windows that contain other documents). For all its virtues, however, Nisus has some serious problems.

Exporting is one area Nisus is weak in. It has Styles that work a lot like Word's, but they don't transfer into PageMaker or Quark. You can save its files in Word format, but the translation filter doesn't work very well. Claris has a Word/Nisus filter that works much better, even though they don't publish either program.

Nisus's search function is supposed to be very powerful (if you can figure out how to program it). But several of the people who used it while preparing this book found it to be exasperatingly buggy.

Nisus doesn't know enough to break a line on an em dash, or on an ellipsis (three- or four-dot). Unless you want huge gaping holes on the right margin (or very loose lines, if your text is justified), you have to put a space after the em dash or ellipsis—and remember to take it out if you add or remove text from the paragraph. This is inexcusable in any word processor, and particularly galling in one as powerful as Nisus.

But Nisus's worst feature is probably its spelling checker, which is so incompetent and inflexible that it's virtually unusable. Although it no longer queries words connected by em dashes (as it used to), it does when they're connected by an ellipsis, treating the ellipsis and the words on either side of it as a single word. (In other words, it will bring up something like *ever...know* and tell you it's one, single, misspelled word—pretty astute, huh?)

You can't tell the spelling checker not to look for repeated words, or first words of sentences that aren't capped. To make matters worse, Nisus apparently thinks that three-dot ellipses end sentences—which they *never* do. So if I refer to a command like *About this Macintosh...* in the middle of a sentence, Nisus will tell me that the next word should be capitalized.

You can't tell the spelling checker to ignore words that begin with capital letters, which makes checking a document that's full of proper names more trouble than it's worth.

Nisus queries hyphenated words, even if both parts of the hyphenated word are in its dictionary, and you can't tell it to ignore numbers. This means you have to fill your user dictionary with *9-point, 10-point, 11-point, 12-point, 100-page, 1.4-meg*—not to mention *1970's, $5, #3,* etc. etc. (A spelling checker should treat words on either side of a hyphen independently, and of course it should ignore numbers—or, at the very least, you should be able to choose both approaches as options.)

In a really bizarre bug, Nisus's spelling checker often queries words containing numbers that are next to punctuation. So even after you've gone to the trouble of putting *24-point* into the user dictionary, it will query *24-point,* (with a comma, that is) and suggest you replace it with *24-point* without the comma!

Nisus's suggested correct spellings for misspelled words would be appalling if they weren't so hilarious. It found *indentical* and offered *enigmatical* as the probable correct spelling (has that word even been used since Queen Victoria died?). Other suggestions included *enigmatically, magnetically(!)* and *indemnitee* (one who's indemnified, I suppose), but not *identical.* However, when Nisus found *deinitely* (I'd left out the *f*), it suggested *identical* there (so *that's* where it's been hiding) and also *genitalia* (at least the spelling checker has a sense of humor).

Nisus' spelling checker didn't recognize the company name *DeltaPoint* (which is understandable, of course) but suggested changing it to *dilate upon.* (Yes, of course—I meant to type *dilate upon*, but my fingers slipped and I accidentally typed *DeltaPoint* instead. These new smart drugs aren't working as well as I'd hoped. I'm getting some weird side effects.)

While Nisus's dictionary has words like *detubation*, which I was only able to find in one of two unabridged dictionaries (it means removing a tube from something—usually a person), it doesn't include thousands of infinitely more common words, names and abbreviations like *Macintosh, Mac, IBM, let's, huh, ah, keystroke, kerned, kerning, kazoo* and *lbs* (just to pick some random examples).

A few problems I pointed out in the last edition have been corrected, and there have been other improvements, but there are still major flaws in Nisus. Nisus Software apparently prefers to concentrate its energies on developing an elaborate, arcane, built-in programming language. (Well, that makes sense. After all, which would you rather have in a word processor—a usable spelling checker or the ability to program?)

This is a classic case of tertiary expertosis, where the sufferer's tiny area of expertise becomes all that's real, and normal people, walking around in the world, seem as insubstantial as ghosts. It's a pity, because I love 90% of what Nisus does, and it has a number of features that I can't get anywhere else (or hardly anywhere else).

Hopefully, Nisus will eventually get on the ball and iron out the remaining problems. Unfortunately, that last sentiment appeared, virtually verbatim, in the Third Edition to this book, published two years before this one. Ah, Nisus—so near, and yet so far.

By the way, I know you've been assuming that Nisus is named after the Trojan soldier who was killed avenging

a friend's death in Book IX of the *Aeneid*. Well, you're wrong—it's just your expensive classical education leading you astray again. No, *nisus* is an ordinary English word—well, not *ordinary*, perhaps, but it's in most dictionaries—that means an *effort* or an *endeavor*.

gossip/ trivia

Nisus Compact (AN)

There's a version of Nisus that's specially sized down and optimized for PowerBooks. The person who was supposed to review it for us flaked out, and there wasn't time to get another reviewer. But if you have a PowerBook, I'd say Nisus Compact is definitely worth checking out.

the Works word processors (AN/ND)

If your budget is limited, or you very seldom do word processing, check out the word processors that come as part of the integrated programs described in Chapter 18, whose names all tend to end in *Works*. For example, Microsoft Works ($250 list) offers word processing *plus* a database, a spreadsheet, a communications program and drawing capabilities.

bargain

That brings the effective price of Works' word processing module down below $100. If you have no use whatever for Works' other modules, however, it's fairer to compare its word processor against programs like Taste, WriteNow and MacWrite (all described above).

WordMaker (KF)

Although WordMaker costs just $125 list, it can do mail merge, search and replace, and can import formatted text from databases or spreadsheets. It also lets you change margins and tabs (left, right, center or decimal) throughout a document, adjust leading and kerning, set the ruler to measure in inches, centimeters, picas, points, etc. and change text to all caps, lowercase or mixed case.

WordMaker has a 100,000-word spelling checker and lets you insert automatic page numbering, time and date. Once you paste a graphic into WordMaker, it's treated independently of text (as opposed to being embedded in it). You can move it around, resize it and even wrap text around it.

Although WordMaker has a lot of good features, I really didn't like using it. As you key in the text, the line of text you're working on flickers every three-to-eight keystrokes. I found this very irritating.

✎ *Letter Writer Plus* (KF)

Letter Writer Plus ($90 list) is a desk accessory, which is handy if you're still working in System 6 (or earlier) without MultiFinder. In that case, it lets you dash off a letter without quitting the application you're in.

Letter Writer Plus can do mail-merge and search-and-replace. It's designed to import directly from Address Book Plus and can import formatted text from databases or spreadsheets.

If you use more than one letterhead, Letter Writer Plus has a *save as stationery* feature. It also has an *insert paragraph* feature that enables you to insert a previously saved paragraph into a letter. And it's set up to address and print envelopes quickly and easily.

But the program has very little formatting flexibility. You choose one set of margins for the first page, one set for the rest and that's it for margins; you get one set of (left) tabs for the entire document and that's it for tabs. In my view, these are serious limitations.

✎ *FullWrite Professional* (ND)

As I write this, FullWrite Professional looks like an orphan. Since Borland bought Ashton-Tate's product line in 1991, it hasn't announced any plans to update or improve the

product—and as FullWrite stands, there's not much to recommend it. Some great features, like electronic Post-It notes and well-designed bibliographic aids make some of its users steadfast fans. But it's too slow and has trouble handling large documents (although, to be fair, we should point out that some readers dispute these criticisms vociferously).

General word processing tips

two basic word processing rules *(SA/AN)*

mostly for beginners

No matter what program you're using, here are a couple of basic rules to follow:

- Only hit the Return key at the end of paragraphs, not at the end of each line.
- Don't use spaces to align words horizontally; they won't line up straight on paper, even if they look straight on the screen. Instead, use Tab to create columns, the *Center* command (or whatever it's called in the program you're using) to center text, and margin or indent settings to move text in from the margins.

insertion point vs. I-beam pointer *(AN)*

mostly for beginners

A common confusion among beginning Mac users (and even some who've been using the machine for a while) is between the *insertion point*—the thin, blinking, vertical line that indicates where the next character of text will appear (or disappear)—and the *I-beam pointer*, which looks something like this: I.

Basically, the I-beam pointer *places* the insertion point. You move the I-beam to where you want the insertion point to be and click the mouse button once. To move the insertion point again, you simply move the I-beam to another place and click again.

Unlike more primitive machines, the Mac has no *cursor.* This term from the world of the PC—and, before that, CP/M—is sometimes incorrectly applied to either the pointer or the insertion point.

(The people who *program* the Mac do use the term *cursor,* and there's a danger that this techie jargon will filter down to ordinary people like you and me. We should resist that, because the terms *pointer* and *insertion point* are more precise and also more elegant.)

em dashes, en dashes and hyphens *(AN)*

Em dash is the technical name for what people normally just call a dash—there's one right there. (It gets its name from the fact that it's more or less the same width as a capital *M.)*

An *en dash* is half the length of an em dash and is used to indicate ranges of numbers (1926–66) or as a minus sign. (It gets its name from the fact that it's more or less the same width as a lowercase *n.)*

Hyphens are shorter than either. Here's a comparison of the three:

em dash —

en dash –

hyphen -

On the Mac, you get an em dash by holding down Shift and Option while hitting -, and you get an en dash by holding down Option and hitting -.

spacing after italics *(DC)*

On dot-matrix printers like the ImageWriter (and on the Mac's screen), italics bend so far over that they crowd, or even run into, the plain-text characters that follow them. This is particularly a problem when the last italic character and/or the first plain character is a capital letter or

a lowercase *b, d, f, h, k* or *l*. (On laser printers, things are easier. Outline fonts are designed so that the italic characters don't crowd the following plain text—except when the italics are computer-generated because there isn't a separate italic printer font.)

Putting two spaces after the italics gives you too much room. The solution is to use the option space, which usually produces a space that's larger than a regular one but smaller than two (you get it, of course, by holding down Option while hitting Spacebar). See the next entry for more details.

the option space *(AN)*

This character, generated by holding down the Option key while using Spacebar, has two unique features. The first is that it's always a *hard* (or *nonbreaking) space*—which means that if it falls at the end of a line, it won't break; instead, it will drag the word before it down to the next line, along with the word after it. This is useful when you want to keep phrases like WW II and J. B. S. Haldane all on the same line, but can make for a very uneven right margin (or, if your text is justified, for lines with very loose spacing).

The second feature is that, in some fonts, the option space is wider than a regular space (but narrower than two). This is also useful for keeping italic characters from leaning into the plain text that follows them in dot-matrix printouts (see the previous entry for details).

The easiest way to see if a font makes the option space wider is to type a character (let's say you use *X*), hit the Spacebar five times, type another *X*, hit Return, type *X*, hold down the Option key, hit Spacebar five times, and type a final *X*. If the option space is wider than regular spaces, the second *X* on the second line will be to the right of the second *X* on the first line; if the option space is the same width as the regular spaces, the *X*'s will line up.

The wider option space occurs only in proportionally spaced fonts (which is what most Mac fonts are); in monospaced fonts like Monaco, hard spaces are always the same width as regular spaces.

This combining of two features into the option space is far from ideal. When you want a hard space, you normally don't want a wide space, and when you want a wide space, you normally don't want a hard space. Hopefully savvy font designers will soon start providing hard spaces and wide spaces as separate characters (Option Spacebar and ⇧⌘ Spacebar, say).

smart quotes *(SA)*

If your word processing program doesn't automatically give you left- and right-leaning (") quotation marks (also called *curly quotes* or *smart quotes)*, and if you're not using a separate smart-quotes utility, you can use your word processor's find-and-replace function to substitute curly quotes for all your straight quotes (").

To do that, you have to assume that every *open* (or *leading)* quotation mark will be preceded by a space—which is almost always the case. *(Close*, or *trailing*, quotation marks aren't necessarily followed by a space, since the next character may be a punctuation mark—or, in programs like Word, a paragraph marker.) Given that assumption, you just replace every instance of the straight quotation mark (") that's preceded by a space with an open quotation mark, (Option [). Then replace every remaining instance of " with a close quote (Option Shift [).

dumb quotes *(C.J. Weigand)*

Using smart-quotes utilities can be annoying, because backspacing over or selecting a quote or apostrophe and then retyping it can leave it facing the wrong direction. I prefer the "dumb quote" approach.

Using QuicKeys (from CE Software, described in Chapter 7), I reassign the curly apostrophe (') to the straight apostrophe key (') and the curly quotes (" ") to the left and right curly bracket keys ({ and } , i.e., Shift { and Shift }). That way I'm always sure of typing the correct symbol. If I ever need to type a straight apostrophe or curly brackets, all I have to do is temporarily turn QuicKeys off (which you do by hitting Option ⌘ .).

[C.J. converted me to this approach, but I did him one better—I assigned the curly quotes to the unshifted { and } keys, to make them even easier to get to. I found relearning the new key positions virtually effortless, even though I'd been touch-typing on the old key positions for almost thirty years.

While I was at it, I made Shift , and Shift . print out as , and . , instead of as < and > . I moved < and > to the , key, and moved { and } to where the curly brackets { and } normally are (Shift { and Shift }). I even thought of getting rid of the letter Z, since I hardly ever use it. But then I thought, zees may be fooleesh. So I relented, and decided to let Z stay.—AN]

low-rent Glossary substitutes *(DC/AN)*

Many word processors don't have *Glossaries* (often-used words, phrases, paragraphs or even graphics that you can recall with a keystroke and paste into your document). But there's an easy and obvious way around that:

Just use two or three unique characters as abbreviations for the longer text. For example, you might type *tmb* every time you want the phrase *The Macintosh Bible* to appear. Then, when you've finished entering your text, just before you check the spelling in the document, you do a global search for *tmb* and replace it with *The Macintosh Bible* everywhere it appears in the document. Some people find this technique of using abbreviations more convenient than permanently setting up Glossaries.

[But remember to check the Whole Word *option when doing this kind of global change. I forgot to when changing all the* RW's *after entries in Chapter 17 to the full name,* Rich Wolfson, *and wound up with dozens of* LaseRich Wolfsonriter's, *several* otheRich Wolfsonise's *and one* straightfoRich Wolfsonard.—*SA]*

✎ *bargain-basement leading* (AN)

As mentioned at the beginning of this chapter, *leading* refers to the space between lines of text. Some word processors don't let you vary it except by choosing single-spacing, double-spacing and the like, but even in these programs you can exert some limited control over leading by using the following (admittedly klutzy) technique:

To change the leading between two lines of text, select a blank space in the second line and change it to a different size. That line will then adjust itself accordingly. When you're satisfied with the results, repeat the procedure for each successive line of text. (Yeah, it's a pain, but at least it's possible.)

✎ *cheap, ersatz Styles* (AN)

If your word processor doesn't have Styles, the following techniques will save you some time and trouble:

Let's say you're writing a document in 12-point Bookman plain with subheads in 18-point Avant Garde bold italic. Switching between the two can cost you a lot of keystrokes and/or trips to the menu bar. But there's an easier way to do it (it may sound a little confusing when you read about it, but just try it).

Let's say you just finished typing a paragraph (in 12-point Bookman) and now you want to type a new subhead. Just go to another subhead somewhere nearby and select any character (or double-click on any word) in it. Then copy that character (or word), paste it where you want the new subhead to be, select it and start to type. What you

type will be in the font, size and style of the other subhead (18-point Avant Garde bold italic, or whatever).

When you're inserting text into some already-existing text (instead of adding it on to the end of a new file you're creating), you often don't have to do any copying. Let's say you've finished typing the subhead and want to go back to your text font. If the text immediately after the subhead is in the text font, just select the first character in it and begin typing. The character you selected will be deleted, so be sure to retype it at the end of what you're inserting.

(The reason for selecting the first character is that the space in front of the text may be in a different font, style and/or size than the text itself. Often it will be the same and all you'll have to do is click in the space, but it's different enough of the time that you're better off always selecting the first letter as a matter of habit.)

This also works if the text immediately before the place where you want to make your insertion is in the font you want. In that case, you begin by retyping the character you selected, then go on to type your insertion. *[You can also record the selection of various paragraph and character formatting commands in a macro program and play them all back with a single keystroke combination.—SA]*

custom letterhead *(AN)*

There are no particular tricks for creating a letterhead—although creating a nice one requires a great deal of skill and taste. But here's a trick on how to deal with one once it's been created:

Assuming you have access to the Mac and a laser printer on a regular basis, don't waste your time printing out blank sheets of letterhead that you'll then have to feed one by one into the printer when you want to use them. Instead, create a dummy document with your

letterhead at the top and a few words in the font you use for the text of letters below it.

Here's a sample that uses Fluent Fonts' Monterey and Monterey Medium for the letterhead and Optima for the text of the letter:

Jack Twiller
512 Pet-de-Loup Boulevard
Halitosis ND 58393
701/555-1941

Date, 1993

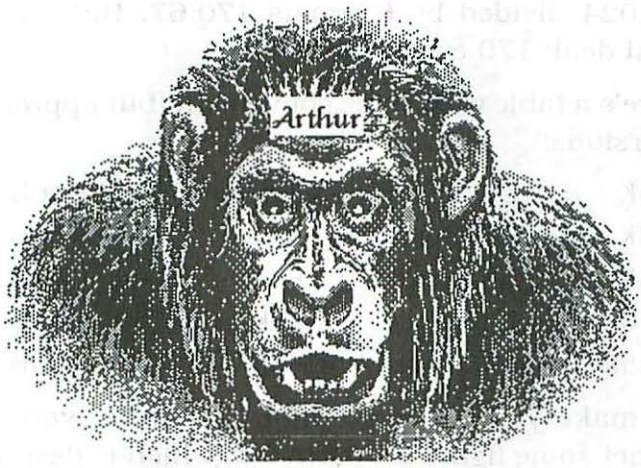
Dear

Save this document as *letterhead* or some similar name. Then every time you want to write a letter, open it and immediately *Save As...* under whatever name is appropriate for the letter you're going to write. Many word processors (and System 7) give you *stationery* for this purpose, which is even easier (you have to rename stationery when you open it or when you save it).

Then double-click on *Date* and change it (some programs let you insert an active date marker in your document, which saves you this step). Place the insertion point after *Dear* and begin writing. When you print out the letter, the letterhead will print out at the top.

You can (and probably should) have more than one letterhead for use with different sorts of letters (business, personal, etc.). In programs that have Glossaries, it's sometimes simpler to store your letterheads as Glossary items and just pop them into a document when you need them—but only if you're happy with the standard margins, font, etc.

If you have a specialized signature, you can either make it the last item in your dummy letterhead document or drop it in from the Scrapbook (or some substitute Scrapbook like SmartScrap). Here's one I used to use (before I became Mr. Mellow):



Of course there's no need for you to feel limited to something as stodgy as this.

(The wonderful gorilla was drawn by master Mac artist Mei-Ying Dell'Aquilla and is available on the ClickArt Personal Graphics disk from T/Maker.)

estimating the number of words in a document *(AN)*

By now, most word processors offer a word count feature, but if for some reason it's easier for you to get the number of characters than the number of words, just divide by six. (Some people divide by five to count words, but it's hard to figure how they arrive at that number—unless they don't count the space at the end of the word. I checked this chapter and got 5.76 characters per word. Since I don't use a lot of fancy, sesquipedalian words—except for that one—most normal writing should average about six characters a word.)

An even faster and easier way to roughly estimate the number of words in a document without having to wait for a word count is to multiply the number of K—which you can get in the Finder, without even having to open the document—by 170. (There are 1024 characters in a K—except when someone's trying to sell you a disk drive—

and 1024 divided by 6 equals 170.67. But for you, a special deal: 170 even. And no tax.)

Here's a table with some convenient (but approximate) conversions:

1K	= 170 words	30K	= 5000 words
3K	= 500 words	50K	= 8500 words
6K	= 1000 words	60K	= 10,000 words
10K	= 1700 words	75K	= 12,500 words
15K	= 2500 words	100K	= 17,000 words

To make your estimate more accurate, you should subtract some figure for *overhead* (which is described at the end of the second entry in Chapter 3). As you add formatting instructions, the amount of overhead increases. Graphics in particular will inflate the figures for both the number of K and the number of characters in a document, thus throwing your calculations off (since there's no way to estimate exactly how much to subtract for overhead).

double-sided printouts *(DC)*

You'll seldom find instructions in a word processor manual for printing on both sides of the paper so that the correct pages will print back-to-back. Here's how you do it:

First print half as many copies of the document as you need. Then arrange them so that the copies of page 2 are on top, followed by the copies of page 1, followed by page 4, then page 3, page 6, page 5, and so on. If there are an odd number of pages in your document, set aside the copies of the last page and substitute blank pages for them in the pile.

On a LaserWriter, place the pile of arranged pages in the paper tray face up, with the top edge of the pages pointing into the printer, and print the other half of the copies. On an ImageWriter II with a sheet feeder, put the pile of pages in upside down, with the printed side facing you.

importing word processing files to the Mac (DC/AN)

If you need to import a word processing document to a Mac from another type of computer (and you don't have a *filter* for translating the file), you have to first save the file on the foreign computer as a text, or *ASCII*, file.

If you neglect this step, the document will be a mess when it gets to the Mac, because word processing programs embed formatting codes in the text that will appear as gibberish on the Mac's screen. The same goes for exporting Mac files to non-Mac computers.

text markers (DC)

Some word processors have a specific function that lets you mark places in a document so you can return to them later. But it's easy enough to do that in any program, simply by inserting unique characters (like *##1*, *##2* and so on, or any other combination of characters that wouldn't appear in normal text). Then you just use the *Find* command to move to these points in your document quickly.

Word tips

Unless otherwise indicated, all these tips work in Word 5, and many work in Word 4 and Word 3 as well.

installing Word 5 (SM)

In order to use Word 5's *Easy Install* option, you'll be amazed to discover you need *seven megabytes* free on your disk for the program and all its minions. *[I can remember Apple's first hard disks. They held five megabytes and boy, were we impressed.—AN]*

If you don't have that much space free and don't want to delay installing Word until you clean up your hard disk, click *Custom Install* and select only the parts of the program you actually need. You can always add other Word utilities later.

✎ *remove Macromaker* (AN/ND)

Macromaker, the macro program that used to be included with the Mac's system software, interferes with Word 5 (it makes garbage characters appear at the right end of the menu bar, and if you click on any of them, you crash). To avoid the problem, remove Macromaker from your System Folder and reboot before installing Word 5.

✎ *adapting to the spelling checker* (PH)

Word 5's spelling checker is slower than Word 4's; if you've added a lot of words to the dictionary it can take longer than a minute to close. If you've quit spelling and your Macintosh looks like it's hung (the pointer moves but nothing happens when you click), take a break and come back in a few minutes.

Also, be aware that (in its initial release, at least) the spelling checker doesn't change the pointer to a watch when it's searching for the next misspelled word. If you're not sure whether it's still searching, check your document to see whether anything is selected. If nothing is, the spelling checker is still hunting. Do *not* click on the buttons to figure out what's happening, because Word will remember your clicks and execute those commands when the current search is finished.

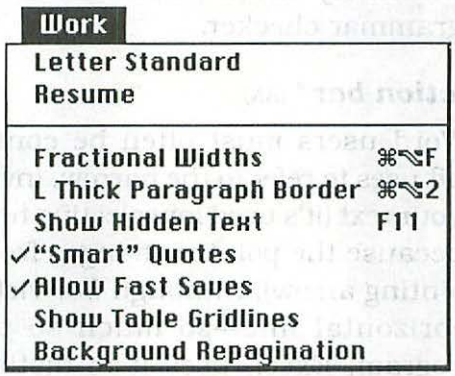
✎ *speeding up the spelling checker* (ND)

To speed up Word 5's spelling checker, select *Preferences...* from the Edit menu, click on the spelling checker icon and uncheck the *Always Suggest* box. Trying to find suggested alternate spellings is a real burden on the program.

✎ *the Work menu* (PH)

When you use the *Commands...* command on the Tools menu to add items to menus, Word decides what menu they go on. Its choice may not seem logical to you. As an

alternative, you can add commands to the Work menu. For example, my Work menu looks like this:



I added *Letter Standard* and *Resume*, files that I open frequently, by using the *Open File Name* command available on the list that appears when you choose *Commands...*. The five other commands are ordinarily found in dialog boxes, but they're more convenient on the Work menu because I often turn them on and off.

editing tables *(PH)*

Although Word makes adding rows to the end of tables easy (just put the insertion point in the last cell and press Tab), inserting rows in the middle or removing rows and columns is a pain—you have to use the *Table Layout* command from the Format menu and then make the appropriate choices.

If you edit tables much, make ⌘-key or function-key keyboard equivalents for the *Insert Columns*, *Insert Rows*, *Delete Columns* and *Delete Rows* commands, so you can access them quickly.

streamlining Word *(RS)*

To speed up Word 5 (in System 7 or MultiFinder), get rid of the grammar checker (by dragging its icon into the Trash) and then reset the memory required to about half of the

suggested 1024K. I haven't had any problems running the program—even with bulky *Macintosh Bible* files—since changing the memory allocation, and I certainly haven't missed the grammar checker.

the "selection bar" *(AN)*

mostly for beginners

Beginning Word users must often be confused by the term Microsoft uses to refer to the narrow, invisible column to the left of your text (it's used for selecting text—you know you're in it because the pointer changes from an I-beam to a right-pointing arrow). Although *bar* virtually always implies a horizontal line—so much so that another Microsoft program, Excel, uses it to distinguish a *bar chart* (horizontal lines) from a *column chart* (vertical lines)—Microsoft calls this vertical column the *selection bar.*

toggling window sizes *(SA)*

shortcut

There are four ways you can toggle between the size and shape window you've created and one that fills the whole screen:

- click on the zoom box (at the right end of the title bar)
- double-click on the title bar itself
- double-click on the size box in the lower right corner
- press Option ⇧ ⌘]

window splitting *(SA)*

shortcut

You don't have to drag the split bar to split a window—Option ⇧ ⌘ S has the same effect. The command works as a toggle, so you can use it to unsplit the window as well.

cycling through windows *(SA)*

shortcut

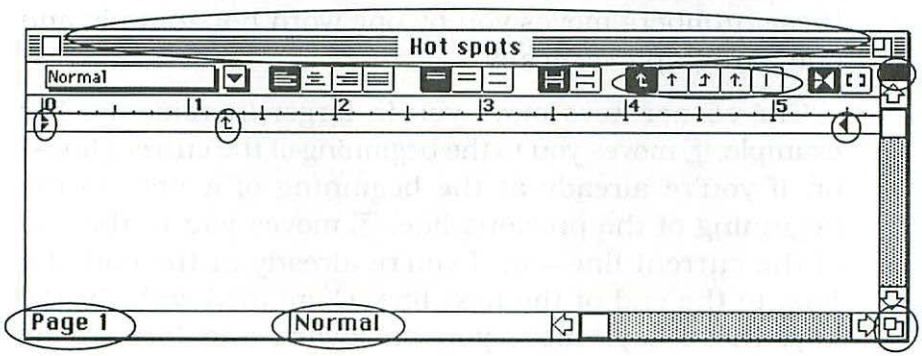
When you have multiple windows on the screen, use Option ⇧ ⌘ W to cycle through them (this sends the topmost window to the bottom of the pile).

hot spot shortcuts (SA/ND/KF)

Word provides shortcuts with *hot spots* in its document window.

double-click on	*to*
any tab mark on the Ruler	open the Tabs dialog box
the page number in the lower left corner of the window	open the Go To Page dialog box
the Style box at the bottom of the window	open the Define Styles dialog box
a margin marker or the numbered area of the Ruler	open the Paragraph dialog box
the split bar in the vertical scroll bar	split and unsplit the window without dragging the bar
the title bar	toggle the window between full-screen size and the the size you defined

Here's an illustration with most of them circled:



keyboard scrolling (SA)

You can scroll a window from the keyboard, just as if you were using the vertical scroll arrows. To scroll up, use Option ⌘ [or * on the keypad; to scroll down, use Option ⌘ / or + on the keypad. (As with regular scrolling, the insertion point stays where it was.)

If you have an extended keyboard, you can use the Pg Up and Pg Dn keys to scroll, but that also moves the insertion point.

using the numeric keypad *(SA/PH/Hal Lewis/ND)*

The numeric keypad has two modes—one in which it issues commands that move the insertion point, select text and the like (let's call this *command mode)* and one in which it enters numbers into the text. This second mode is called *Num* (for *numeric) Lock.* The Clear key toggles you between them.

When you're in Num Lock, it says so in the status box in the lower left corner of the window. (Unfortunately, it doesn't trigger the Num Lock light that's available on extended keyboards.) *[The number of the page you're on is normally shown in the same little box. If you see* Num Lock *in that box and want to know the page number, just hit Clear.—AN]*

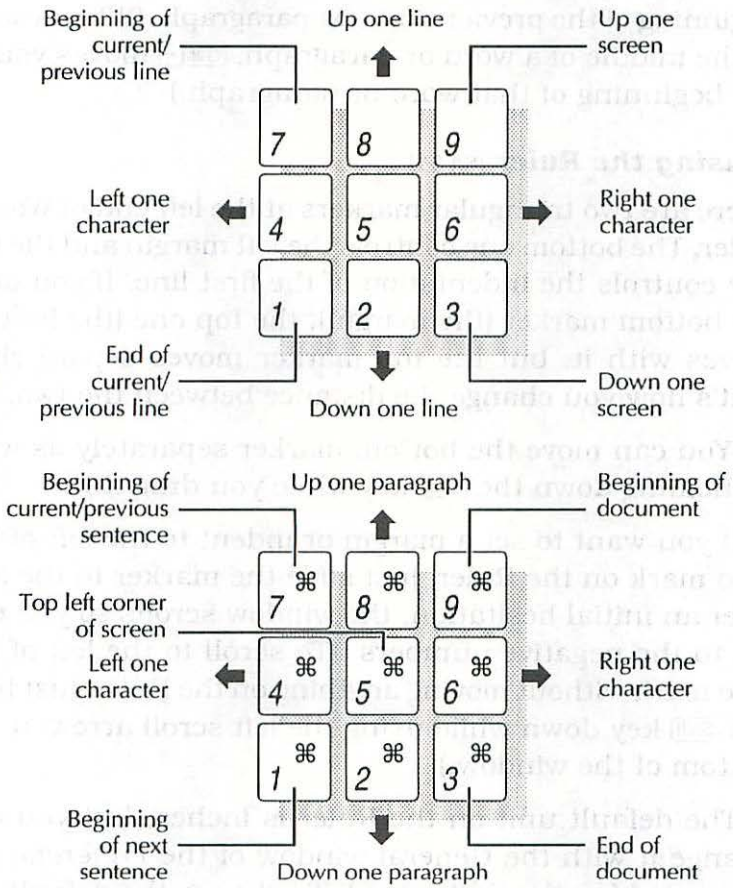
In command mode, the 2, 4, 6 and 8 keys move the insertion point one line vertically or one character horizontally (in the obvious directions). Adding the ⌘ key to these numbers moves you by one word horizontally and one paragraph vertically.

The corner keys move you in larger increments. For example, 7 moves you to the beginning of the current line—or, if you're already at the beginning of a line, to the beginning of the previous line. 1 moves you to the end of the current line—or, if you're already at the end of a line, to the end of the next line. Combined with the ⌘ key, these keys move you backward and forward by sentences instead of by lines.

The other corner keys, 9 and 3, move you backward and forward a screenful at a time. Combined with the ⌘ key, 9 moves you to the beginning of the document and 3 to the end.

The 5 key doesn't do anything by itself, but ⇧⌘5 jumps the insertion point to the top left corner of the current screen.

Here's all that in diagram form:



The 0 (zero) on the keypad moves you to the last position of the insertion point. Say you're typing and see a mistake. You can go to the mistake and correct it, then press the keypad 0 to jump right back to where you were. (Word remembers your last four positions, so you can use the keypad 0 for even more complicated series of jumps around your document.)

✎ ⌘ arrow keys (SA)

You can also extend the basic arrow-key movements with the ⌘ key. Combining ⌘ with ← or → moves you to the beginning of the previous word or to the beginning of the next word. Combining it with ↑ or ↓ moves you to the beginning of the previous or next paragraph. (When you're in the middle of a word or paragraph, ⌘← moves you to the beginning of that word or paragraph.)

✎ using the Ruler (SA/PH)

There are two triangular markers at the left end of Word's Ruler. The bottom one controls the left margin and the top one controls the indentation of the first line. If you drag the bottom marker (the margin), the top one (the indent) moves with it, but the top marker moves separately—that's how you change the distance between the two.

(You can move the bottom marker separately as well, by holding down the Shift key while you drag it.)

If you want to set a margin or indent to the left of the zero mark on the Ruler, just slide the marker to the left; after an initial hesitation, the window scrolls so you can get to the negative numbers. (To scroll to the left of the zero mark without moving anything on the Ruler, just hold the Shift key down while using the left scroll arrow at the bottom of the window.)

The default unit on the Ruler is inches, but you can change it with the General window of the *Preferences...* command (on the Edit menu). To change the default tab stops, use the *Document* command and type the new distance you want in the Default Tab Stops box.

✎ moving several tabs at once (SA)

When you have a series of tabs on the Ruler, moving one doesn't affect the others—unless you hold down Shift, in which case all the tabs to the right of the one you're

dragging move together. This is very useful when you have tabbed columns set up and want to shift them all.

customizing menus with the mouse *(SA/ND)*

You can add many commands to (or subtract them from) Word's menus without using the *Commands...* command. To add them, first press Option⌘+. This gives you the *plus pointer*, which looks something like this (only bigger): + . (Calling it Option⌘+ helps you remember the command, but you don't actually have to hold down the Shift key; in other words, Option⌘= works just as well.)

Once you have the plus pointer, click on the item you want added to the menu. You can click on:

- items on the Ruler, including the various kinds of justification, line spacing and paragraph spacing, as well as Styles on the menu that pops down from the Ruler
- any of the commands on the Outline Ruler
- items from most dialog boxes—for example, paragraph and character formats
- Glossary entries
- Styles

Pressing Option⌘- gives you the *minus pointer*, which looks something like this (only bigger): – . Select something from a menu with the minus pointer and it's deleted—no matter how it got there to begin with.

You can add several items to (or delete them from) your menus without having to call up the plus or minus pointer each time. Just hold down the Shift key when you click on an item or select it from the menu. It will be added or deleted, and the pointer will remain a plus or a minus.

keyboard control of menus *(SA/PH)*

Word allows total control of menus from the keyboard. This involves four steps—activating the menu bar (getting it ready

for keyboard control), choosing a menu to display (the equivalent of clicking on its title with the mouse), choosing a command from it (the equivalent of dragging down to that command with the mouse) and executing the command (the equivalent of releasing the mouse button).

To activate the menu bar, you press . on the keypad or ⌘Tab. To choose a menu, you either type the first letter of its name or the number that corresponds to its position on the menu bar. (The menu is zero.) Or you can move to the menu title with the ← and → keys. (After one menu is down, only the arrow keys will take you to another.)

To choose a command, hit the first letter of its name. If more than one command begins with the same letter, repeated pressings of the letter key will select each of the commands in turn. Or you can move up or down in the menu with the ↑ and ↓ keys.

To execute the command, you press Return or Enter. (As with almost everything in Word, you can cancel the procedure at any time by pressing ⌘. or Esc..)

Keyboard sequences are handy for often-used commands that don't have command keys assigned to them. If you're a decent typist, they take far less time than reaching for the mouse. Here are some of my favorites (you don't type the commas, of course; they're just there to indicate that you press the keys one after the other, not at the same time):

Print Preview	., F, P, Return
Save As	., F, S, S, Return
Sort	., U, S, S, Return

keyboard commands in dialog boxes *(SA/PH)*

Word gives you more than one way to choose buttons in dialog boxes without having to take your hands off the keyboard. Here are the basic techniques:

- If there isn't a text field in the dialog box, pressing the key that corresponds to the first letter of the name of a button chooses the button (⌘C for Cancel, ⌘O for OK, etc.).
- ⌘. and Esc also select the *Cancel* button.

Word also has keyboard commands that let you cycle through the *items* (buttons, text fields, lists and pop-up menus) in a dialog box. When you move to an item, a flashing underline appears beneath it.

- To move from one item to the next, use the period on the keypad or ⌘Tab.
- To move to the previous item (that is, to move backwards through the items), use Shift⌘Tab.
- To activate a button or open a pop-up menu once you've moved to it, hit the zero on the keypad.

There are also keyboard commands for choosing from lists or pop-up menus.

- To choose from a list, use the ↑ and ↓ keys. In some dialog boxes, typing a letter selects the first word in the list that begins with that letter (the Commands dialog box is one that works like that).
- To choose from an opened pop-up menu, use the ↑ and ↓ keys or type the first letter of the item's name. Press Return when the item you want is highlighted.
- To close a pop-up menu without selecting anything from it (or to close it and return to the original selection), press Esc or Delete.

basic selection commands *(SA/ND)*

To select:	
a word	double-click anywhere in it
a sentence	⌘-click anywhere in it
a line	click in the selection bar
a paragraph	double-click in the selection bar
the entire document	⌘-click in the selection bar or press ⌘A

(And, of course—as with virtually all Mac programs—you can also select any amount of text either by dragging across it or by clicking at one point and then shift-clicking at another.)

using Shift to select (SA)

mostly for beginners

If you use any pointer-movement technique with the Shift key held down, you select the area the pointer moves across. So, for example, Shift⌘← selects the last word you typed.

To extend the selection, just hold the keys down. So, for example, holding Shift⌘← down will continue the selection backward, word by word, until you release the keys.

Note that shift-clicking to extend a selection works in the original unit of the selection. So, for example, if you ⌘-click to select a sentence, shift-clicking someplace else extends the selection to include the whole sentence you've shift-clicked on, regardless of where in that sentence you shift-clicked.

using Option to select (SA/PH/ND)

Holding down the Option key as you drag lets you select any rectangular area of the screen, regardless of where there's text.

In earlier versions of Word, if you wanted to delete an Option key selection, you had to cut it (⌘X)—you couldn't use Delete. (The Mac would just beep at you if you tried.) In Word 5, you can use ⌘X or Delete.

Note that if any part of a graphic is selected this way, the entire graphic is affected by the deletion or formatting.

selecting text without ¶ formatting (Jennifer Shroder)

very hot tip

[This tip only works in Word 4, not Word 5, but it's so good we wanted to include it anyway.—AN] You sometimes want to select one or more paragraphs of text to copy but

don't want to copy the paragraph formatting (which is stored in the Return at the end of the paragraph). To eliminate the paragraph formatting, select the paragraph and then press Shift←.

special deletes *(SA)*

As you no doubt know, the Delete key erases the character to the left of the insertion point. And you can also use it to delete whatever amount of text you've selected. But Word has other delete commands as well:

- Option⌘F erases the character to the right of the insertion point. If you have an extended keyboard, the ⌦ key does the same thing.
- Option⌘Delete deletes the previous word—or, if you're in the middle of a word, everything from the insertion point to the beginning of the word.
- Option⌘G deletes the next word—or, if you're in the middle of a word, everything from the insertion point to the end of the word.

alternative ways to cut or copy *(SA/PH/ND)*

With the drag-and-drop feature in Word 5, you can do the equivalent of a cut (or copy) and paste without using the Clipboard—or the cut, copy or paste commands. (This can be useful if you have something in the Clipboard and don't want to lose it.) If you don't have Word 5, you can still move text (and/or graphics) without using the Clipboard:

- Select the material you want to move and press Option⌘X. The words *Move to* appear in the status box in the lower left corner of the window.
- Click in the spot you want the text moved to, or select the material you want it to replace. (A clicked spot shows as a dotted vertical line; a selection is underlined in gray.)
- Press Return or Enter.

To copy text (and/or graphics) without the Clipboard, follow the same procedure but use Option ⌘ C instead of Option ⌘ X (the words in the status box will read *Copy to* instead of *Move to).*

To remember which key you have to add to the normal cut and copy commands (⌘ C and ⌘ X), think of these commands as *optional cut* and *optional copy.*

✎ *the "top of paste" jump* (SA)

After you paste something into your document, the insertion point is left at the bottom of the pasted-in material. To move it back to the top of the pasted material, just hit the zero on the numeric keypad or Option ⌘ Z. (Since all pastes are done at the insertion point, the top of the paste is always the previous position of the pointer.)

✎ *keyboard character formatting* (SA/Hal Lewis)

There are ⌘ Shift keyboard commands for all of Word's character formats, even if they're not noted on the menu or in the character dialog box:

Character format	Keyboard command	Character format	Keyboard command
Bold	⌘ Shift B	Shadow	⌘ Shift W
Italic	⌘ Shift I	SMALL CAPS	⌘ Shift H
Underline	⌘ Shift U	ALL CAPS	⌘ Shift K
Word Underline	⌘ Shift]	Hidden	⌘ Shift X
Double Underline	⌘ Shift [	Smaller Font	⌘ Shift <
Dotted Underline	⌘ Shift \	Larger Font	⌘ Shift >
~~Strikethru~~	⌘ Shift /	Superscript	⌘ Shift +
Outline	⌘ Shift D	Subscript	⌘ Shift −

✎ *copying character formats* (SA)

You can copy existing combinations of character formats (font, size and styles) and apply them to existing text or to the insertion point, so they affect whatever you type next.

To copy character formats to existing text:

- Select some text formatted the way you want and press Option ⌘ V. The words *Format to* appear in the status box (in the lower left corner of the window).
- Select the text you want the formats applied to. (This second selection is underlined rather than highlighted.)
- Press Return or Enter.

To copy character formats to the insertion point (so that what you type next will have the new formats):

- While nothing is selected, press Option ⌘ V. The words *Format from* appear in the status box.
- Click in any text that's formatted the way you want. The click leaves a dotted vertical line.
- Press Return or Enter. The dotted "insertion point" disappears, the regular insertion point begins blinking again and you can continue typing with the new character formatting.

You can cancel either procedure at any time with ⌘ . or Esc (the words *Format from* in the status box will disappear).

plain text *(SA)*

To specify plain text, hit Shift ⌘ Z. Option ⌘ Spacebar doesn't remove character formatting—it returns the selected text to the formatting that's defined in the Style of the paragraph it's in. That's why the equivalent command in the Format menu is called the *Plain For Style [whatever that means—AN].*

soft and hard hyphens *(SA)*

Word gives you a choice of three different kinds of hyphens. *Regular hyphens* are what you get when you hit the hyphen key (-); they're always displayed, and the words they connect split when the hyphen falls at the end of a line.

A *soft hyphen* (also called a *discretionary hyphen)* is only displayed when it falls at the end of a line (and the words it connects are split). To enter a soft hyphen, type ⌘ -.

A *hard hyphen* (also called a *nonbreaking hyphen)* is always displayed, but it won't let the words it connects be split across two lines. To enter hard hyphens, type ⌘-.

kerning (SA/ND/AN/SM)

Using Word's Condensed spacing (in the Character dialog box) removes some of the space between letters, but it doesn't do true *kerning*, which lets letters overlap into each other's vertical space on the page. But Word can kern letters with its special (if arcane) typesetting language.

To kern letters, use the *Displace* command to move the second letter of a pair backwards. Start the typesetting formula by typing Option⌘\. (That's the backslash character, not the regular slash that's on the same key as the question mark.) This shows up simply as a backslash, but with *Show Paragraphs* turned on, you can see it's the typesetting character—a backslash preceded by a period.

Use *d* for displace, *ba* for backwards and then the number of points by which you want the next letter shifted. The basic formula looks like this:

.\d.\ba4()

The 4 is the number of points you want the letter moved and, yes, that's a set of empty parentheses at the end. (We told you it was arcane.)

By nesting this formula between pairs of letters, you can turn

WAVE into WAVE

With Show Paragraphs turned on, the command for the kerned word *WAVE* looks like this:

W.\d.\ba4()A.\d.\ba4()V.\d.\ba2()E

Put the basic kerning formula—.\d.\ba4()—into the Glossary so you can retrieve it anytime you need it; all you'll have to do is change the number of points you want the letters to move.

keyboard paragraph formatting *(SA/Hal Lewis)*

Here are the keyboard equivalents for the formats listed in the Paragraph dialog box:

Paragraph format	Keyboard command
Plain ("Normal")	⌘ Shift P
Left Justify	⌘ Shift L
Right Justify	⌘ Shift R
Centered	⌘ Shift C
Full Justify	⌘ Shift J

Paragraph format	Keyboard command
Indent First Line	⌘ Shift F
Nest	⌘ Shift N
UnNest	⌘ Shift M
Hanging Indent	⌘ Shift T
Double Space	⌘ Shift Y
Open Space	⌘ Shift O

Unlike character formats, they don't act as toggles. Sometimes (as with *Indent First Line* and *Double Space*), nothing at all happens when you apply the format a second time; sometimes (as with *Hanging Indent* and *Nest*), the text is further affected by the command, with margins being moved again, beyond where they had already been moved to.

copying paragraph formatting *(SA)*

To copy paragraph formatting, follow the procedures described in the entry above called *copying character formats*, with one difference: to select the text that's formatted the way you want, double-click in the selection bar to select the entire paragraph.

line spacing and paragraph spacing *(SA)*

There are two sets of spacing icons on the Ruler, with related commands in the Paragraph Format dialog box—line spacing (the space between the lines within a paragraph) and paragraph spacing (the space before and/or after a paragraph). These options are entirely independent of one another.

leading control *(SA/PH)*

To control leading in Word, go to the Paragraph dialog box (the keyboard shortcut is ⇧⌘M), select *Exactly* under

mostly for beginners

Line: and then type the number of points of leading you want into the *Line* box. (You don't need to type *pt* or anything after the number; Word knows you mean points if you don't specify inches or anything else, and in fact automatically puts *pt* after the number the next time you open the dialog box.)

So, for example, if you want to print out text 11/13 (11-point type on 13-point lines, which is what you're reading now), you first select the text, then go to the Character dialog box and type *11* in the *Size* box, then go to the Paragraph dialog box, choose *Exactly* and type *13* in the *Line* box.

eliminating shifting text *(SA)*

If you're inserting new text in the middle of an existing paragraph, it can be really distracting to have the rest of the paragraph shifting to the right and down. To avoid this, put a paragraph marker to the right of the insertion point, by pressing Option-⌘-Return. This pushes the rest of the paragraph down and leaves the insertion point where it was.

When you're finished inserting text, use Option-⌘-F or ⌦ to remove the temporary paragraph marker; this joins the two paragraphs again.

supercharging **Replace:** *(PH/ND)*

very good feature

In Word 5, you can search for and replace text in specific fonts, type styles and sizes. You can even search for *any* text with a given font, type style or size, or for a particular Style from the document's Style sheet. So, for example, you can search for *all* 11-point Optima plain text and change it to 10-point Dom Casual italic, for example.

There are still a few limits, though. The *Find What:* and *Replace With:* text boxes in the Replace dialog box (on the Tools menu) have a limit of 255 characters, and you can't specify more than one font, type style or size (one of each, that is) in the text that you're searching for or replacing.

But there is a way around that limitation—you insert the contents of the Clipboard into the *Find What:* or *Replace With:* box. To indicate that you want the contents of the Clipboard to go into either of those text boxes, you use ^c—that is, the caret (Shift 6) followed by the letter *c* (cap or lowercase, it doesn't matter).

For example, let's say you want to change every occurrence of The Nation to remove the underline and to italicize the second word, so that it reads: the *Nation.* First you fix the style of the first occurrence of The Nation so that's the way you want it (the *Nation),* then select it and copy it to the Clipboard. Choose the *Change* command.

Then, in the *Find What:* box, type The Nation (the underline doesn't show up as you type, but the label *Underline* appears underneath the text box). In the *Replace With:* box, type ^c. Then click on the *Replace All* button and every occurrence of The Nation in your document will be changed to: the *Nation.*

the Again command *(SA/PH)*

The *Again* command (⌘Y) repeats the last command, your last edit, or the last thing you typed. For example, if you've just applied a Style to a paragraph, you can click in another paragraph and use *Again* to apply the Style there too.

If you want to use *Again* to apply a group of character or paragraph formats (bold, outline and italic, say, or justified, indented and double-spaced), use the Character and Paragraph dialog box rather than the keyboard or the Format menu. That way the *Again* command will apply to all the formats in the dialog box, instead of just the last one you applied.

finding again *(SA/PH)*

To find another occurrence of the word, phrase or format you last searched for, you don't have to open the Find or

Change dialog boxes again—just press Option-⌘-A, or use the = key on the numeric keypad.

Combining this with the general *Again* command (⌘-Y) lets you search for something, apply a format to it and then search for the next occurrence, all from the keyboard and without using dialog boxes.

unusual Glossary entries *(SA/PH)*

The Glossary can store anything that you can select in the document. Here are some entries that may not have occurred to you, but which can be quite useful:

- Graphics (for example, a logo or a letterhead).
- Section breaks. All the section definitions (number of columns, page number position, etc.) are stored in the section-break symbol (a double line that runs across the page). Keeping them in the Glossary lets you apply section-formatting options quickly.
- Character format combinations. To do this, select a single character with a variety of formats—14-point Times bold italic, for example—and store it in the Glossary. When you retrieve it, hit Shift-← to select it and then type whatever you want—the new typing will have the retrieved format.
- Paragraph formats. First press ⌘-J (or choose *Show ¶* from the View menu). Then select a paragraph marker (¶) and open the Glossary window. (Why retrieve paragraph formats from the Glossary instead of using a style sheet? Because the style sheet includes character formatting, and sometimes you won't want that.)
- Tables. Create tables with the number and size of rows and columns you need, and store them in the Glossary for quick retrieval.

You can put a Glossary entry into the Work menu (using the *Commands...* command). You can also retrieve graphics, character and paragraph formats, section breaks and tables with keyboard commands (again, using the *Commands...* command).

standard and nonstandard Glossaries (SA)

When you create a Glossary entry, it's only good for the current session—unless it's specifically saved into the Standard (default) Glossary that Word starts within each session. You'll be prompted to do that when you quit Word, but you don't have to wait till then—just choose *Save* from the File menu while the Glossary window is open.

To save a specialized Glossary as something other than the Standard Glossary, use *Save As* when the Glossary window is open. To retrieve a nonstandard Glossary, use *Open* when the Glossary window is open.

To create a new Glossary with nothing in it (except the default entries of New, Date and Time), just open the Glossary window and choose *New* from the File menu.

sorting (SA)

Word is smart enough to know the difference between punctuation marks and other symbols (which it sorts first), numbers (which it sorts second) and letters (which it sorts last). Capital letters are put before their lowercase equivalents (e.g., *Mac* before *mac) [that doesn't seem very smart to me—AN]* and accented foreign characters are put with their unaccented equivalents (e.g., *e* with *é*, *u* with *ü*, etc.) Word is even smart enough to sort alphanumeric combinations correctly, so you get *9a* and *9b* before *10a* and *10b*.

To sort in descending order (highest numbers first or *z* to *a)*, press Shift as you select the *Sort* command from the Utilities menu. (You'll notice that the command becomes *Sort Descending* when Shift is down.)

creating and changing default Styles (SA/PH/SM)

There are default Styles that Word always uses, like the Normal Style and those used for automatic page numbers and index entries. You can change their definitions and add new defaults of your own.

Why should you want to add your own defaults? Because nondefault style sheets are stored with the document in which they were created (or into which they were imported; for details, see the entry below called *importing or merging style sheets).* So if you create a Style for one document and forget to define it as a default, you'll have to import it into each document you want to use it in.

To make a Style a default, just select it in the Style dialog box and click the *Set Default* button.

Changing default Styles is easy. Just hold down the Shift key, choose *Style...* from the Format menu and select the Style you want to change. The names of the default Styles have a bullet (•) in front of them. (If you don't see them, click *All Styles.)*

Prime candidates for changes are:

- the Normal Style (the default for a new document)
- page number (used for the automatic page number)
- line number (used when you want the lines of your document numbered)

Page number and line number are based on the Normal Style, so if you change Normal to Times 10-point, the page numbers and line numbers will also be in that font.

no retroactive default Styles *(SA)*

When you change the definition of a default Style, paragraphs defined as that Style automatically reflect the changes—but only in the current document and future ones. A pre-existing document using that Style will not show the changes—unless you either open the document, Select All and paste it into a new, empty window, or import the new style sheet into it (see the next entry for how to do that).

importing or merging style sheets (SA)

If a document has no style sheet, you can import one from another document. If it does have a style sheet, you can merge it with one from another document.

To import or merge, open the Style dialog box and choose *Open* from the File menu. Select the document whose style sheet you want and click the *Open* button.

Note that when both documents have Styles with the same name, the imported one replaces the current one.

combining Styles in a document (SA)

To merge two Styles in a document (turn all your *Unit Title* paragraphs into *Chapter Title* paragraphs, say):

- Open the Style dialog box.
- Select the Style you want to get rid of. (You can't just cut it, or all the paragraphs you've formatted in that Style will revert to Normal Style.)
- In the text box that displays the Style's name, type a comma and then the name of the Style you want to change to. (In this example, you'd select the Style *Unit Title* and change its name to *Unit Title,Chapter Title*).
- Click the *Define* button. You'll get a dialog box asking if it's okay to merge the Styles. Click the *OK* button.
- Now select the new (combined) Style and change its name, deleting the old name. (For example, change *Unit Title,Chapter Title* to simply *Chapter Title*.)

When you're finished, all the paragraphs that used to be formatted for the *Unit Title* Style will be *Chapter Title* Style, and the *Unit Title* Style itself will be gone from the Style sheet.

Next Style override (SA)

When you define a Style to have a Next Style, pressing Return to start a new paragraph switches to that next Style. When you want to stay in the current Style, you can override the Next Style option by pressing ⇧⌘Return instead.

✎ *double-clicks in Print Preview* (SA/PH)

Double-clicking the page number icon puts the page number in its default position in the upper right corner of the page. (Double-clicking on the page margin or single/double page icon does nothing but confuse you; the clicks are interpreted as two single clicks and therefore simply put you into, and right back out of, the modes they stand for.)

✎ *paging and scrolling in Print Preview* (SA/PH)

There are keyboard equivalents you can use instead of the scroll bar in Print Preview. Any of the following will move you backward or forward one page:

- the ↑ and ↓ keys
- the 8 and 2 keys on the keypad
- Option ⌘ / and Option ⌘ [

In addition, you can jump to the first page with ⌘ 9 (keypad) and to the last page with ⌘ 3 (keypad).

✎ *deleting the automatic page number* (SA)

To get rid of an automatic page number while in Print Preview, just drag it off the page. It won't look like anything has happened, but if you click the margins icon to update the display, you'll see that the page number is gone.

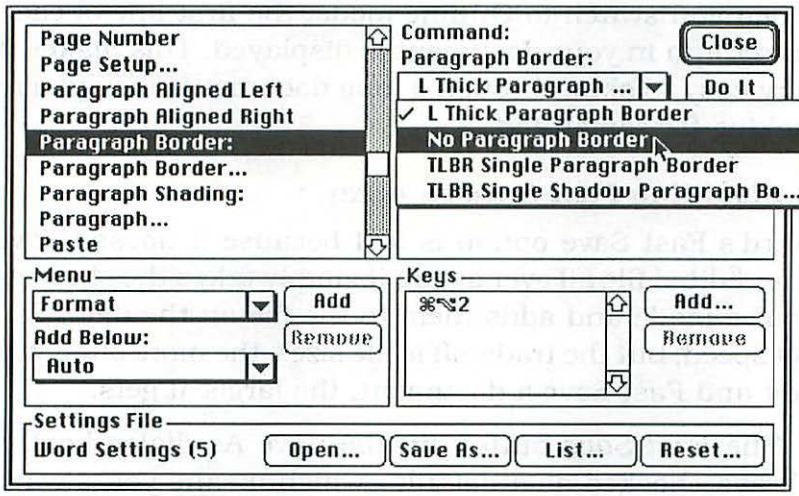
✎ *removing paragraph borders* (SA/PH)

Removing paragraph borders by working in the Borders dialog box is time-consuming. You have to click on each bordered side of a paragraph to take the lines off. If you're working on multiple paragraphs with differing border styles, it's even worse, because it's hard to tell which lines you're turning on and which you're turning off.

It's easier to use the *No Paragraph Border* command to remove all the borders from selected paragraphs. Here's how to put the command in the Format menu:

- Choose *Commands...* from the Tools menu.
- Choose *Paragraph Border:* in the command list. The *Paragraph Border:* command appears to the right, above a menu box displaying *L Thick Paragra...* (one of the four basic border commands you can add to the menu).
- Click in the menu box, or on the arrow next to the box, and choose *No Paragraph Border* from the menu that appears.
- Click on the *Add* button.

Here's how it looks on the screen:



sizing and cropping graphics (SA)

Dragging the handles on the frame that surrounds a selected graphic resizes the frame, but not the picture. Making the frame smaller than the graphic crops the image, leaving the upper left part of it showing. Making the frame larger centers the picture in the frame.

To change the size of the picture instead of cropping it, hold the Shift key as you drag on the frame. To return a graphic to its original size, double-click on it.

✎ *the graphics dump* (SA)

To turn any part of a Word document into a graphic, select it and hit Option ⌘ D. This puts a snapshot of it on the Clipboard. Although this feature is meant to allow you to transfer complicated formulas (constructed with Word's typesetting commands) into other programs, it also can be handy within Word, because it lets you distort text by turning it into a graphic and then stretching or shrinking it. (For more details, see the entry called *creating special typographic effects* in Chapter 6.)

✎ *scanning a long document* (SA)

When you switch to Outline mode, the first line of each paragraph in your document is displayed. This makes it very easy to skim through a long document when you're looking for something.

✎ *disabling Fast Save* (SA/PH/ND)

Word's Fast Save option is fast because it doesn't save your edited file all over again; it simply takes the changes you've made and adds them to the file on the disk. You get speed, but the trade-off is file size—the more often you edit and Fast Save a document, the larger it gets.

The *Fast Save* button (in the Save As dialog box) is always checked as a default—which means you always get a fast save when you simply use the *Save* command (because unless you *Save As...*, the Save As dialog box doesn't open and you can't uncheck the button).

You can disable the automatic fast save by putting the *Allow Fast Saves* command in your Edit menu (so you can turn it on or off whenever you want). This command is a toggle—choosing it alternately turns it on and off. When it's off (no checkmark in front of it), the *Fast Save* button in the Save As dialog box is *disabled*—dimmed so it can't be selected at all. Then when you use the *Save* command, you get a regular save.

To add the command to your menu:

- Choose *Commands...* from the Tools menu.
- Choose *Allow Fast Saves* in the command list.
- In the Menu box, select *Edit* from the pop-up menu and then click the *Add* button.

Once you've disabled the button, you can remove the command from the menu—the button stays dimmed even with the command gone. But it's smarter to simply leave the command in the menu, in case you ever want to turn *Fast Save* on again.

Screen Test *(SA/PH/ND)*

Word has its own built-in screen saver, called Screen Test, but like so many of Word's capabilities, it's pretty well hidden. Here's how to add it to your menu or assign it a keyboard combination:

- Choose *Commands...* from the Tools menu.
- Scroll to the command *Screen Test* and select it.
- Click the *Add* button if you want to put in your Tools menu.

OR

- Assign it a keyboard command and click the *Add* button next to that box.

You can, of course, do both—put it in the menu *and* assign it a keyboard equivalent.

Screen Test puts on a terrific display (especially if you have a color monitor). Once it's on, hit any key or click the mouse button to bring up a dialog box that lets you change various options for the display. Have fun with this one!

[If you want to see what Screen Test looks like before installing it, click on the Do It *button instead of the* Add *button in step three above.—AN]*

✎ *the footnote window* (SA/PH)

To review or edit text in the footnote window, press Shift while you drag the split bar, or press Shift Option ⌘ S. To close the footnote window, drag the split bar to the top or bottom of the window, or press Option ⌘ S.

You don't have to close the footnote window after typing text into it. You can just click in the main part of the window to continue working on your document, or hit ⌘ Option Z or 0 (zero) on the keypad (to place the insertion point immediately after the footnote reference mark in the main document).

✎ *removing returns from imported documents* (DC/PH)

Sometimes when you transfer a document created on another computer into Word, you'll find carriage returns at the end of each line. (Use ⌘ J to see where all the carriage returns are; they show up as ¶'s.) Since Word uses carriage returns only to mark the ends of paragraphs, you'll need to remove all the ones that fall elsewhere. Here's how to do that:

Select the entire document. Now choose *Replace* from the Edit menu, and change each occurrence of ^p^p (Word uses ^p to represent carriage returns) to some unique characters that don't appear anywhere in the document, such as ##. Click the *Replace All* button.

Next, choose *Replace* again and change each occurrence of ^p to a single space (just use the space bar). Click the *Replace All* button. Now choose *Replace* for a third time and change each occurrence of ## (or whatever you're using) to ^p. Again, click on the *Replace All* button.

All the carriage returns in your document should now be at the ends of paragraphs. (⌘ J will reveal if any unwanted ones remain.)

Outliners

outliners (SA/ND)

mostly for beginners

An outliner is, in effect, a specialized kind of word processor with graphic features that make it easy for you to reorganize your material. You enter text on indented *levels* or in *headlines*, and then you drag it around. If you're thinking that you can do that in a regular word processor, by using tabs for indenting and then cutting and pasting to reorganize—you're wrong. Picture yourself cutting and pasting icons on the desktop every time you want to move something, and you'll get an idea of the difference in convenience.

The various levels or headlines don't have to be single words or phrases—they can be multiple paragraphs of text or even graphics. And best of all, you can *collapse* or *expand* the outline—looking at, for example, only all of the first level headlines, or everything up to the third level, or all the levels that are subordinate to the third first-level headline. Being able to get an overview of your document's structure, and to zero in on any section of it, is invaluable.

The usefulness of outliners isn't limited to organizing large text documents. You can, for example, use them to create calendars, or to-do lists on which you can reprioritize items simply by dragging them to a different spot. In fact, both outliners reviewed below have phone dialers built in, for the people who use them as address book organizers.

More 3 (SA/ND)

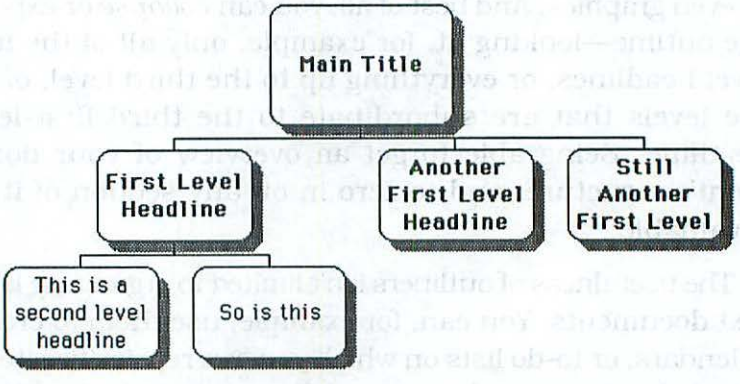
very good feature

More lets you create multiple-line headlines and attach a window to any or all headlines for further text or graphic information. It automatically labels headlines and subheads by any of a number of schemes—including ones you make up yourself.

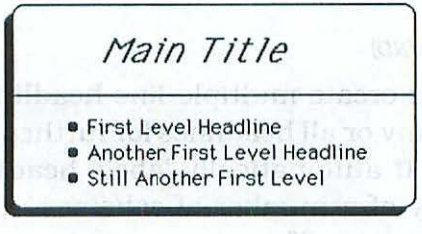
You can define formatting for any group of headlines (including font, size, style, color and leader characters) and you can store and retrieve the combination (like style sheets in a word processor). More lets you view your information in more than just the straightforward text view. You can choose bullet charts or tree charts, and there are lots of additional choices within those categories. Here's a basic outline view:

+ **Main Title**
  + **First Level Headline**
    - This is a second level headline
    - So is this
  - **Another First Level Headline**
  - **Still Another First Level Headline**

And here's a tree chart of the same information:



Here's the first screen of the bullet chart for the same outline:



The next bullet chart would have the First Level Headline in the place of the Main Title with the second level headlines bulleted underneath (by default it would be formatted the same, but you can define different styles of charts for different levels).

Beyond outlining, More makes it easy to design bulleted slide presentations and/or handouts from your outline. There's even a slide show option, with special effects from one screen to the next.

More 3 added more text controls, like a ruler for placing tab stops, super- and subscript type and a command that lets you delete headers and footers from the first page of a document. There's a library of presentation templates to streamline the design process and a set of drawing tools if you'd rather build your slides from scratch. You can also turn data into charts within More 3, instead of having to paste charts in from another program.

If you need heavy-duty outlining, you should consider shelling out the $400 More 3 costs, whether or not you need presentation graphics. If you don't do presentations and only need light-to-medium outlining power, see the next entry.

If you're upgrading from More II, remove it from your hard disk before installing More 3 to avoid minor glitches like document icons converting to generic icons. Then, if you expect to reuse bullet charts created in More II, copy it back on (if you open More II bullet charts in Version 3, they sometimes have mixed-up formatting).

Acta 7 *(SA/ND)*

Acta (from Symmetry) was the first outliner that came as a DA (desk accessory). When More grew into a complicated, expensive, high-end outliner/presenter, Acta grew from a desk accessory to a stand-alone application—Acta 7 ($150 list). It's still available as a DA (which is useful if

you're still working under System 6 without MultiFinder) but the application has more features—headers and footers, page preview, search and replace, up to nine open windows and on-screen topic labels. Acta is perfect for anyone who needs an outliner but doesn't need the high-end power of More.

Spelling checkers

✒ *finding the right spelling checker* (SB)

mostly for beginners

Everyone who does word processing on a Mac should use a spelling checker. It doesn't make much difference whether you consider yourself a good speller, because most errors are typos. Spelling checkers not only help you to find these, they let you correct them quickly and efficiently.

But remember: No spelling checker can find errors in which you inadvertently substitute a valid word for the one you intended (*form* for *from*, say, or *tow* for *two*). So you should proofread a document one last time after running it through a spelling checker.

Virtually all Macintosh word processors now come with built-in spelling checkers, and they're generally pretty good. But some people may still want a stand-alone spelling checker to use with other applications, and to get features not included in a particular built-in checker.

Some spelling checkers offer *batch checking*, which processes an entire document, or a selected portion of it, at once. Some also offer *interactive checking*, which means the program interrupts you every time you type something it doesn't understand. Interactive checking makes me lose my concentration, but you may prefer it.

A big dictionary is one of the most important features of a good spelling checker, because it cuts down on the number of *false alarms*—correctly spelled words it doesn't

recognize. The fewer of these, the faster you'll finish checking a file. Another advantage of a large dictionary is that it's more likely to offer a correct spelling as an option, which is the fastest way to make a correction.

I like a dictionary of at least 80,000–100,000 words. Much smaller than that and there may be more false alarms than actual spelling errors, which is a real annoyance. Most stand-alone checkers offer statistics, including word count—a feature which, as a journalist, I'm very fond of.

Many built-in and stand-alone programs offer extras. A *Glossary* function is one of the more useful of those. This allows you to make a list of abbreviations and the full text they represent. Type the abbreviation and the full text appears (e.g., you might type *td* when you want today's date). The text to be substituted can be quite long, so whole paragraphs of boilerplate can be put in the Glossary. Some Glossaries even accept carriage returns, which makes it possible for you to insert your whole address (or somebody else's) by typing a simple abbreviation.

Other extras offered by some programs include the ability to recognize the entire ASCII character set, not just the standard alphabet. This lets you put words with foreign accents and even mathematical formulas into the dictionary.

Another useful extra feature is flagging double words (like *and and*), which are both very common and among the most difficult mistakes to spot when proofreading. Some spelling checkers also look for incorrect capitalization and simple punctuation errors like unmatched parentheses or quotation marks. Automatic hyphenation and hyphenation checking are offered by many programs.

Being able to view the actual dictionary and make changes in it is very useful (especially since virtually all dictionaries contain some errors).

A final consideration when choosing a spelling checker is how many different applications it can work with without having to change the formatting. Some DA spelling checkers have some problems with character formatting, because they use the Clipboard as part of their correction routine. This sometimes causes problems with applications that don't follow Apple's guidelines.

Thunder *(SA/ND)*

Thunder 7 ($100 list) is a terrific spelling checker that works both in batch and interactive mode. Thunder lets you add items to its dictionaries and will count words in your document. It works under System 7 or System 6's MultiFinder (you go to the Control Panel and designate the applications you want Thunder to be active in, and the Thunder menu title—a checkmark—appears in the menu bar when you run them).

Thunder has a couple of great features. Its Glossary function lets you define misspellings that will be automatically fixed as you type them, so *hte* turns into *the* without your doing anything. You can turn *mb* into *Macintosh Bible*, *s7* into *System 7*, and create a complete shorthand dictionary.

In interactive mode, Thunder watches as you type; you don't have to wait and check the entire document later. *[Isn't it amazing how much people's tastes differ? I'd rather be tortured by some CIA-trained goon than have a spelling checker flash or beep at me while I'm typing.—AN]* Yes, but in some programs you *have to* have interactive spell-checking or you can't have any spell-checking at all—like databases, which make the text final once you leave a field, and online services *[so that's why Nancy's AppleLink messages are so full of typos—SM]*.

Anyway, you don't ever *have* to have interactive checking turned on (although you need it for the Glossary feature). You can set the beep to any sound at any volume

(independent of the System sound setting), or you can just have it flash silently.

Spelling Coach Professional *(SA)*

Spelling Coach Professional is the son of Spelling Coach and the grandson of MacLightning, one of the earliest Mac spelling checkers (that's where Thunder got its name—the reply to lightning). It has a large basic dictionary (licensed from Merriam-Webster) and also provides specialized legal and medical dictionaries that you can add terms to. Definitions are supplied for many of the words in the main dictionary, and there's a built-in thesaurus.

The program works both interactively and as a batch checker. It's annoyingly slow in batch mode and once you've asked for suggestions, you can no longer type in your own choice. The interactive checker isn't as powerful as Thunder's; it doesn't have a powerful Glossary feature and it doesn't check for capitalization mistakes or for for doubled words (like those—did you notice them?).

At $200 list, Spelling Coach Professional is twice the price of Thunder, so you have to decide what's more important to you—Coach's thesaurus, dictionary with definitions and specialized medical and legal dictionaries or the lower price and better interactive checking of Thunder.

Spellswell *(SB)*

One of the most popular spelling checkers, Spellswell works with a large number of applications (the current version, 2.2, lists for $40). Options include medical and legal and other specialized dictionaries ($50 each) and LookUp, a DA that allows you to look up the spelling of a word from anywhere you have access to the menu. It will also paste a word selected from the dictionary into almost any program.

Spellswell checks homonyms, double words, capitalization and some punctuation (as well as spelling, of course), but it's only an average guesser. Its dictionary contains 105,000 words.

Spellswell *(AN)*

Is it Spells Well or Spell Swell? Only its publisher knows for sure. Either way, their spelling checker is one of the better ones on the market.

I used Spellswell for a while but fell afoul of its inability to ignore special characters like dashes—which, as you can see, I use all the time—and foreign accents (I was working on a book on Central America and got tired of adding words like *Jos* to the dictionary because Spellswell couldn't deal with the *é* in *José).* But aside from that, this is an efficient, well-written program.

Word Finder Plus *(AN)*

Word Finder isn't a spelling checker—it's a thesaurus in the form of a desk accessory. It's one of those products that makes you wonder how you lived without it.

Word Finder's thesaurus contains 220,000 synonyms for 15,000 words. That sounds like a lot, but I'd like it to be even more extensive. Still, it's so useful to have a thesaurus as a DA that I hardly ever consult my paper one anymore.

Word Finder's operation is slick and obvious; it finds words fast and usually gives you a lot of them. If you need the manual to use this program, you don't know much about the Mac. At $70 list, this is a must-own product. *[I second that.—SA]*

Dictionary Helper *(AN/Larry Pina)*

Dictionary Helper is a file of 1313 words (how's that for a lucky number?) that normally aren't found in the dictionaries of spelling checkers. Instead of having to add these words to the dictionary one by one whenever you

happen to use them in something you write—which can be an incredible nuisance—just open Dictionary Helper, run your spelling checker on it and add all the words at one sitting.

That's a tedious task but it's a lot better than doing it piecemeal. Some spelling checkers will let you import all the words in bulk, so you don't have to click *OK* or *Add* for each one.

Dictionary Helper adds less than 9K to your spelling checker's dictionary(ies) but it greatly reduces the number of "false alarms"—flagged words that are actually correct. Here's what it contains:

- contractions (with both straight and curly apostrophes)
- everyday abbreviations like *Thurs, Apr, St,* etc.
- the 26 letters of the alphabet as stand-alone words
- the names of the 50 states, their standard two-letter abbreviations, their capitals and other major US cities
- the names of foreign countries and large foreign cities
- common US first names and nicknames
- common US last names
- common brand names
- the names of some famous people (inevitably a very subjective—and incomplete—list)

In all the above categories, names are omitted when they're also words. So, for example, the first names list omits *Art, Bill, Bob, Dawn, Frank, Nick, Pat* and *Ray;* the last names list omits *Miller* and *Smith;* the cities and states lists omit *New, South* and *Little Rock;* and the days of the week abbreviations omit *Sat* and *Sun.*

We may have missed a few common names, or decided to err on the side of caution, but it doesn't matter—if words on this list are already in your spelling checker's dictionary, all that will happen is you won't be queried about them—or if you're importing the whole file in bulk, your dictionary(ies) will contain a few extra words.

Names are also omitted when they're in some other list. So, for example, *Jan* isn't in the list of first names because it's in the list of month abbreviations, and the names *Lincoln*, *Jefferson* and *Madison* aren't in the list of famous people's names because they're in the list of state capitals.

If you want to type out the file yourself, here it is (we don't envy you). For those of you who can't handle the boredom, Peachpit has included Dictionary Helper on the Fourth Edition of the *Macintosh Bible Software Disks* (described in Chapter 20). Feel free to add and/or delete words from the file to make it fit your particular needs.

aren't can't couldn't didn't doesn't don't hasn't haven't he'd he'll he's I'd I'll I'm I've isn't it'd it'll it's she'd she'll she's shouldn't should've that'd that'll that's there's they'd they're they've they'll wasn't we'd we'll we're weren't we've who've won't wouldn't would've you'd you'll you're you've

aren't can't couldn't didn't doesn't don't hasn't haven't he'd he'll he's I'd I'll I'm I've isn't it'd it'll it's she'd she'll she's shouldn't should've that'd that'll that's there's they'd they're they've they'll wasn't we'd we'll we're weren't we've who've won't wouldn't would've you'd you'll you're you've

Mon Mo Tues Tue Tu Thurs Thur Thu Th Fri Fr Sa Su Jan Feb Mar Apr Jun Jul Aug Sep Oct Nov Dec Ave Av bldg Blvd Cir Ct dept Dr hwy Ln Rd Sq St Ste Wy NW NE SW SE amp avg cc cm ext ft gal lb ml mm mph mpg pkg pp qt tel yd yr TV VCR UHF VHF Mr Mrs Ms Jr Sr II III IV MD DDS BA AB BS MA PhD meg megs MB cps dpi Hz MHz CP/M MS DOS PC el le la los las les de des di von van der San Santa a b c d e f g h i j k l m n o p q r s t u v w x y z

AL AK AZ AR CA CO CT DE DC FL GA ID IL IA KS KY LA MA MD MI MN MS MO MT NE NV NH NJ NM NY NC ND OH OK PA PR RI SC SD TN TX UT VT VA VI WA WV WI WY

Montgomery Alabama Juneau Alaska Phoenix Arizona Arkansas Sacramento California Denver Colorado Hartford Connecticut Dover Delaware Tallahassee Florida Atlanta Georgia Honolulu Hawaii Boise Idaho Springfield Illinois Indianapolis Indiana Moines Iowa Topeka Kansas Frankfort Kentucky Louisiana Augusta Maine Annapolis Maryland Boston Massachusetts Lansing Michigan Minnesota Jackson Mississippi Jefferson Missouri Helena Montana Lincoln Nebraska Carson Nevada Concord Hampshire Trenton Jersey Fe Mexico Albany York Raleigh Carolina Bismarck Dakota Columbus Ohio Oklahoma Salem Oregon Harrisburg Pennsylvania Rhode Columbia Carolina Pierre Nashville Tennessee Austin Texas Utah Montpelier Vermont Richmond Virginia Olympia Washington Charleston Madison Wisconsin Cheyenne Wyoming Columbia Juan Puerto Rico

Angeles Chicago Francisco Philadelphia Detroit Dallas Houston Nassau Pittsburgh Baltimore Minneapolis Newark Anaheim Cleveland Diego Miami Seattle Tampa Bernardino Cincinnati Milwaukee Portland Orleans Antonio Lauderdale Tucson Memphis Jacksonville Paso Tulsa Toledo Oakland Albuquerque Omaha Charlotte Louisville Wichita Birmingham Norfolk Corpus Christi Fresno Rochester Petersburg Akron Jose Ana Shreveport Lexington Yonkers Dayton Arlington Vegas Lubbock Huntington Knoxville Riverside Spokane Chattanooga Wayne Syracuse Stockton Tacoma Worcester Greensboro Berkeley Cambridge Jolla

Afghanistan Albania Algeria Andorra Angola Argentina Australia Austria Bahamas Bahrain Bangladesh Barbados Belgium Belize Benin Bhutan Bolivia Botswana Brazil Bulgaria Burma Burundi Cambodia Cameroon Canada African Chad Chile Colombia Congo Costa Rica Cuba Cyprus Czechoslovakia Denmark Dominican Ecuador Egypt Salvador Ethiopia Fiji Finland France Gabon Gambia Germany Ghana Greece Grenada Guatemala Guinea Guyana Haiti Honduras Hungary Iceland India Indonesia Iran Iraq Ireland Israel Italy Jamaica Japan Jordan Kenya Korea Kuwait Laos Lebanon Lesotho Liberia Libya Liechtenstein Luxembourg Madagascar Malawi Malaysia Maldives Mali Malta Mauritania Mauritius Monaco Mongolia Morocco Mozambique Nauru Nepal Netherlands Zealand Nicaragua Niger Nigeria Norway Pakistan Panama Paraguay Peru Philippines Poland Portugal Qatar Romania Rwanda Marino Saudi Arabia Senegal Sierra Leone Singapore Solomon Somalia Africa Spain Sri Lanka Sudan Swaziland Sweden Switzerland Syria Taiwan Tanzania Thailand Togo Tonga Trinidad Tobago Tunisia Uganda USSR SSR Volta Uruguay Vatican Venezuela Vietnam Samoa Yemen Yugoslavia Zaire Zambia Zimbabwe

Addis Ababa Ahmedabad Alexandria Algiers Amman Amsterdam Ankara Antwerp Athens Auckland Baghdad Baku Bandung Bangalore Bangkok Barcelona Barranquilla Beijing Beirut Belfast Belgrade Belo Horizonte Berlin Bern Bogotá Bogota Bombay Brisbane Brussels Bucharest Budapest Buenos Aires Cairo Calcutta Calgary Cali Canton Caracas Casablanca Chittagong Chongqing Cologne Copenhagen Cordoba Cuenca Dacca Damascus Delhi Dhaka Dnepropetrovsk Donetsk Dresden Dublin Düsseldorf Dusseldorf Edinburgh Edmonton Essen Frankfurt Fukuoka Geneva Genoa Glasgow Gorky Guadalajara Guayaquil Hague Haifa Hamburg Harbin Havana Helsinki Ho Chi Minh Hyderabad Ibadan Istanbul Jakarta Jerusalem Johannesburg Kanpur Karachi Kharkov Kiev Kinshasa Kobe Kuala Lumpur Kuilbyshev Lagos Lahore Paz Lausanne Leipzig Leningrad Liege Lima Lisbon Liverpool Lódz Lodz London Lyons Madras Madrid Managua Manchester Manila Marseilles Mecca Medellin Melbourne Milan Minsk Monterrey Montevideo Montreal Moscow Munich Nagoya Nanjing Nantes Naples Novosibirsk Odessa Osaka Oslo Ottawa Oxford Palermo Paris Peking Porto Alegre Prague Pusan Pyongyang Quebec Quezon Quito Rangoon Recife Rio Janeiro Riyadh Rome Rosario Rotterdam Saigon José Santiago Santo Domingo São Sao Paulo Sapporo Seoul Seville Shanghai Sheffield Shenyang Singapore Sofia Stockholm Stuttgart Surabaja Sverdlovsk Sydney Taipei Tashkent Tbilisi Teheran Tel Aviv Tianjin Tokyo Toronto Tripoli Tunis Turin Valparaiso Valencia Vancouver Venice Vienna Volgograd Warsaw Wellington Winnipeg Yokohama Zurich

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Macintosh Mac Sony Motorola IBM DEC NEC GE Toshiba Panasonic Toyota Honda Acura Nissan Mazda Chevrolet Buick Pontiac Cadillac Oldsmobile Chrysler Plymouth Jeep Porsche Volkswagen Audi BMW Saab Volvo

Sigmund Freud Einstein Marx Engels Darwin Plato Socrates Isaac Newton Pascal Kant Ludwig Beethoven Johann Sebastian Bach Wolfgang Amadeus Mozart Brahms Mendelssohn Corelli Vivaldi Ellington Armstrong Parker Gillespie Coltrane Goodman Basie Pablo Picasso Henri Matisse Orson Welles Humphrey Bogart Marlon Brando Hepburn Ali Shakespeare Milton Dickens Orwell Eliot Auden Yeats Whitman Kafka Dante Goethe Nietzsche Hugo Shelley Keats Byron Dylan Hemingway Fitzgerald Faulkner Reagan Nixon Kennedy Eisenhower Truman Roosevelt Hoover Coolidge Taft Monroe Paine Gorbachev Stalin Lenin Mao Winston Churchill Adolph Hitler Napoleon Bonaparte Jesus Christ Moses Jehovah Mohammed Allah Buddha Confucius Luther Brahma Vishnu Shiva Krishna Rama

Chapter 10

Databases

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Database programs

database terms (SA/AN/SM/JK)

mostly for beginners

Here are some basic terms you need to know when using a database program. To help make them clearer, we'll compare each with a concrete, real-world example that you're undoubtedly familiar with—a Rolodex file.

- A *field* is a single item of information, like a name or an address. It's the equivalent of a single line on a Rolodex card.
- A *record* is a grouping of related fields, like a person's name, address, phone numbers, etc. It's the equivalent of a single Rolodex card.
- A *database file* is a collection of related records. It's equivalent to all the cards on a given Rolodex file.
- A *database program* (or *database manager)* is the software that creates and handles database files. It's partly equivalent to the Rolodex file itself—the wheel, the knobs, the dividers, etc.—but because computer software has more intelligence than physical objects, another part of what a database program does is equivalent to what *you* do when you put cards on a Rolodex file, rearrange them and so on.

Just to make things confusing, both *database files* and *database programs* are also sometimes called simply *databases*. So you might say, *which database do you think is best for a small business?* (referring to a program), but you'd be just as likely to say, *which of these databases has your customer data on it?* (referring to a file). In this chapter, we tend to use *database* to refer to the software and *database file* or *document* to refer to the information itself—but, here as elsewhere, only the context will ultimately tell you which is meant.

Other basic terms aren't so easily related to the physical world, since they relate to the computer's special capabilities:

- A *field name* is a label you use to refer to the field—*First Name, Last Name,* etc. The *field data* is the information you put into the field—John, Smith, 123 Elm St, etc.
- A *calculated* or *computed* field contains a formula that computes data from other fields in the same record. For example, you might have a field called *subtotal* that adds up several fields that have prices in them, a second field called *sales tax* that indicates what percentage to add to *subtotal* and a third field called *grand total* that multiplies *subtotal* by *sales tax* and then adds the result to *subtotal.*
- A *report* is a printout of information in a database (or based on it). It can be a simple list, like a bunch of mailing labels, or it can include computations. These *report calculations* differ from calculated fields in that they gather data from more than one record—a calculated field might total all the items on a single invoice, while a report might total your sales for the month.
- *Sorting* lets you arrange records alphabetically, numerically or chronologically (forwards or backwards). Most databases let you do *multilevel sorts,* so you might have your customer file sorted by zip code, and within each zip code, by the customer's last name.
- *Selecting* finds records that match certain criteria. For example, you might look for all invoices that have outstanding balances more than 60 days old. Or you might select all customers in Colorado with total sales of $500 or more.
- A *multiuser* database is one that can be used on a network by more than one person at a time (although only one person can *change* a particular record at any given time).

✎ *flat-file vs. relational databases* (SA/CS)

mostly for beginners

There are two main types of database programs. *Flat-file* programs (also known as *file managers)* create database files that are independent of one another. Some examples are FileMaker, Panorama and the databases that are part of integrated programs (see the next entry).

Relational database programs (like 4th Dimension, Omnis and Double Helix) create database files that can exchange information with each other. For example, you might have three interrelated files—*Order Entry*, *Customers* and *Inventory*. When you enter a customer's last name in the Order Entry file, the address and phone number are retrieved from the Customers file (if s/he's bought from you before) and automatically filled into the invoice you're preparing. At the same time, the information on the new purchase is added to the customer's record in the Customers file and the items purchased subtracted from the totals in the Inventory file.

important warning

If you don't need the power of a relational database, don't get one, because they're more expensive and much more difficult to set up. A real relational database is actually a specialized programming environment (some relational databases are easier, but they all require programming). It takes hours (and hours and hours) of designing and programming to get what you need. And that's not counting the days it will take just to learn how to use the program.

✎ *stand-alone, integrated, special purpose* (SM)

The programs discussed below are general-purpose, stand-alone databases, both flat-file and relational. For information about the database modules in integrated programs like Microsoft Works and ClarisWorks, see Chapter 18. For info on databases specifically designed to manage phone numbers, addresses and appointments, see Chapter 12.

FileMaker Pro *(CR/SA/JK/SM/AN)*

FileMaker has been the flat-file database of choice for Mac users ever since the program first came out in 1985. It offers a lot of flexibility for creating layouts, yet it's relatively easy to learn and use. Another great advantage is its lookup function, which automatically enters data from another database file into the active one.

Since information can only be pulled into, not sent out of, the active file, FileMaker's lookup function is only halfway relational. For example, you can't work in an order entry file and have information on the items ordered automatically sent to a file of customer sales histories.

The current version, FileMaker Pro ($300, from Claris), offers MacDraw-like graphics capabilities and greater control over users' access to data. The import function is particularly brilliant. It lets you browse through data you're importing—from any of several formats, including *.dbf* (one of the most common ones)—and line it up next to the appropriate fields in your FileMaker file.

You can also create dozens of different views for each file and make simple *scripts* that, accessed from a special menu, automate such operations as switching to a different view, sorting or searching for specific records, and printing. There's a full set of graphic tools with which to add extra text (or graphics) to a layout, create new graphics, and resize and rearrange fields. For fast and error-free data entry, you can format fields to display pop-up menus, checkboxes, radio buttons or scrolling lists of predefined entry possibilities.

Most flat-file databases are made to be used by one person, but FileMaker Pro has great multiuser features. You can share a file with any number of people on a network (even if you don't have AppleShare or System 7), and you can assign passwords to different users to control their access to various layouts or fields.

As we write this, another version—FileMaker Pro 2.0—is about to come out; it should be available by the fall of 1992. The biggest improvements will be in scripting. You'll be able to include *any* FileMaker Pro operation in a script, rather than just a few. Scripts will accept Apple Events, which will let you send commands to other programs that support Apple Events. For example, you'll be able to create a script that exports data from selected records, opens a spreadsheet program like Resolve, uses the exported data to create a new spreadsheet, creates a chart from the data and then copies the chart back into a FileMaker Pro layout. (Amazing, huh?)

There will also be a new field type called *Sound* (so you can add voice comments to records) and *Picture* fields that will support QuickTime movies.

So, to sum up: unless you need a fully relational database, FileMaker is a very good choice. Even if you never use its multiuser features, the layout, scripting, lookup and import/export capabilities put it far ahead of other flat-file programs.

Panorama *(JK/ByB/AN)*

Panorama ($400, from ProVue) is a flat-file database, but its lookup capabilities let you link different files in a limited way. It only works with a single user, but it has a lot of unusual and useful features, like clairvoyance.

Clairvoyance reads data as it's being typed, and if what you're typing matches data in existing records, it finishes the entry for you. (If it guesses wrong, you can just continue typing over the guess.) This not only speeds entry but also reduces the chance of your accidentally spelling a name (or whatever) more than one way. It's especially useful for mailing lists in which a few cities are repeated over and over again, or in financial records when you repeatedly invoice or pay the same vendors.

You can also set fields for automatic first-letter capitalization or a variety of other "smart" default values. Version 2 has added even more data-entry shortcuts.

Panorama's basic file structure is called a *data sheet;* it looks a lot like a spreadsheet, with each record forming a row and each field a column (thus the marketing slogan, *the database that thinks it's a spreadsheet).* This lets you see all your records at once—limited only by the size of your screen. As in Excel, the width of the fields can be altered simply by clicking on the field name and dragging the double-headed arrow left or right.

Panorama keeps your entire database file in RAM, which makes it very fast but limits the size of your files to the space you have in memory, not on disk. This can particularly be a problem under System 7 (and System 6's MultiFinder), where documents are limited by the memory size you've set for Panorama.

Like FileMaker Pro, Panorama provides advanced drawing features like magnification, pixel-accurate drawing and a wide selection of tools. And when you select a graphics tool from the palette, a pop-up title tells you what the tool does. The program is full of thoughtful touches like this.

very good feature

ProVue's customer support is free, prompt and helpful, although the expertise of the techies varies. The manual is thorough, well written and well laid out.

Panorama provides great flexibility, power and—especially—speed. You immediately grasp how it works, yet it's powerful enough to let you build quite sophisticated databases. If you're working with small files on a single Mac and speed of operation is a paramount concern, it gives FileMaker a run for its money.

4th Dimension (SA/AN)

The first versions of 4th Dimension were stunted by lack of speed, miserable documentation and all-round dis-ease of use. But version 2.2's speed is more than reasonable and its new manuals are better—although still pretty daunting.

On its most basic level, 4th Dimension is easy to use. Of course, if all you ever need is the basic level, you don't need 4th Dimension—especially since it lists for $800. Anything beyond basic is not for the faint-of-heart, but if you know some programming (or you're willing to learn), 4th Dimension can be made to do some amazing things—like creating what appears to be a Macintosh stand-alone application, complete with buttons, checkboxes, scrolling lists and pop-up menus.

If you're planning to develop several specialized databases, 4th Dimension is a rich environment to work in. But if you need only one specialized database for your business, it will probably be more cost-effective to hire an outside consultant to design and program it for you than to invest the hours you'll need to learn how to do it in 4th Dimension yourself.

FoxBASE+/Mac 2 (JK)

This dBASE clone works on Macs and PCs, and comes in single- and multi-user versions. The Mac version is fast, handles relational tasks well and combines the power of dBASE with the Mac's user-friendly interface.

You can select commands via pull-down menus or type them in à la PC. If you open the command window and then select commands from the menu, the command sequence that's generated appears at the same time in the window, where it can be edited, printed or saved as a program. This is an excellent way for aspiring dBASE/FoxBASE+ programmers to learn commands and syntax.

You can access up to ten files at once in separate windows. FoxBASE+ "browse" mode lets you resize and reposition fields in relation to one another. The versatile FoxReport function uses a graphic interface to create reports or labels and lets you execute logical functions that relate data from different files.

FoxBASE+/Mac ($500 list) is a powerful, versatile tool for anyone who wants to run dBASE applications on the Mac, handle and interrelate large files, or produce reports requiring complex manipulations of data. But it's not an entry-level Mac program. For those who want user-friendliness and don't need a programmable relational database, FileMaker is a much easier program to learn and use.

❦ *File Force* (CS)

File Force ($400) is an attempt by Acius (the publisher of 4th Dimension) to lure customers away from FileMaker and other flat-file databases. Its advertising claims that it's as easy to use as a flat-file database yet gives you relational power.

That's true only if you can use one of the many business and home-office templates shipped with the product (which is easier than designing your own database in FileMaker). But if none of these templates meet your needs, you're confronted with much the same relational design complexity you'd face in 4th Dimension.

Possibly for this reason, File Force hasn't been a commercial success. Acius still sells it, but don't look for System 7 upgrades or other energetic support.

❦ *Microsoft File* (CS)

This program has been around forever. It wasn't great when it came out and it's hardly changed since then. Version 2.0 finally supports graphics and color, and it's respectably fast, but the main improvement is its interface to the world of paper. Microsoft has outfitted File with a huge variety

of forms, designed to print onto standard Avery stationery and labels.

If all you do with a database is maintain a mailing list (and your letters are written in Word), you may find File—at $200 list—a cost-effective choice. But for more general purposes, FileMaker is a much better product.

data analysis *(CS)*

If you store business information in a database, you'll probably find data analysis features helpful. With relatively simple tools you can spot trends, estimate financial requirements and prepare summaries.

Flat-file databases, like FileMaker Pro, have simple functions like *minimum, maximum, average* and *standard deviation.* You can use them to forecast this year's sales, for instance, by figuring that they'll fall between last year's minimum and maximum. A more sophisticated approach is to take last year's monthly average and project the range of possible monthly results of the average plus or minus one standard deviation.

Trend prediction is most often done with *regression analysis,* a technique that fits a line through a set of data points. FoxBASE+/Mac, 4th Dimension and spreadsheets like Excel, Resolve, and Lotus all have that capability. Fancier capabilities are available as inexpensive add-ons for Excel ($12–$30 from Heizer Software).

If you need to do more advanced kinds of analysis than you can get from your database, several programs are available. Two packages that rely heavily on visualization rather than a user's math background are JMP ($700 list; $350 for students or teachers) and Data Desk ($600 list). Both combine impressive graphic analysis with very friendly manuals.

StatView II ($500) and Systat 5.2 ($900) are more traditional statistics packages. Systat has everything you'll ever

need to analyze statistics, even if you become a professional consultant. But if you don't do serious statistics every day, you'll probably find StatView easier to use.

General database tips

plan ahead (SA/AN)

There are two things to think about when designing a database—what information you need stored, and how to organize it. The first question is pretty straightforward but the second may require some thought.

As an obvious example, if you have a vast mailing list and want to print labels sorted by zip code, the zip code will have to be in a separate field, not part of a larger address field. Or, if you send form letters to clients, you'll want a separate field for a title, so the Mr.'s will get *Mr.*, the Ms.'s will get *Ms.* and the Dr.'s will get *Dr.* in front of their names. (There may be a way around it if you mistakenly lump info into the same field and later want to separate it out. See the last entry in this chapter.)

Conversely, you don't need to put info in a separate field if it's never going to be used separately. For example, the list of companies in Appendix B of this book could be done in a database file where the address—street, city, state and zip—were all in one field.

formatting zip code fields (SA/AN)

Make sure your zip code fields are set up to treat entries as text and not as numbers. A numeric zip code field will strip off the leading zero from 07461 and will perform a subtraction on 07461-8976 (giving you -1515—try reconstructing your data from something like that!).

duplicate files before working on them *(Steve Michel)*

It's good practice to keep at least two copies of any database file, and three of any active one. But if you're too lazy to do that, at least do yourself the favor of duplicating a database file before launching the application to work on it. Most databases keep their files on disk and constantly update them while you work. So the file you had on disk when you began to work is not the file you'll return to when you're done.

This constant, automatic saving to disk is a good feature, since it means that you don't have to worry about losing any appreciable amount of work if the system crashes. But if you make some changes you later want to discard, you're stuck—unless you made a copy of the file before you started, or are using a database like Panorama, which only saves when you tell it to.

annotating databases *(Steve Michel)*

One of the drawbacks of most Mac databases is that they don't give you a good way to document what you're doing as you do it. For simple files, this isn't much of a problem. But for more complex ones, it's easy enough to forget what a particular report, sort or calculation is supposed to do. I have one file I use at least three times a week, but recently when I went to make some changes to it, I lost a couple of hours' work because I hadn't made extensive notes while I was designing it.

Make the notes in a desk accessory like miniWriter, MockWrite or Acta. They'll come in especially handy if you're designing an application for someone else to use, even if it's just a mailing list. They'll help you to explain it to the person using it, and to yourself, when you go to modify it weeks or months later.

multilevel sorts (SA/SM)

Some databases only let you sort on a single field at a time. If you need a multilevel sort (for example, records arranged by city, by zip code within city and by last name within zip code), just do three sorts in reverse order of importance. In other words, in the example above, you'd sort *first* by last name, next by zip code and *last* by city. (This may not work with all databases, but it will with most.)

FileMaker tips

a Help file in larger type (SA)

FileMaker's Help file is itself a FileMaker file. So once you know how to use FileMaker, you can easily change the size of the Help file's window, or the size of the text in any of its fields.

bypassing the Delete alert (SA/JK)

When you use *Delete Record* to remove a record from your file, FileMaker asks you if you're sure you want to delete it. This is a normal Mac touch—giving you a chance to change your mind before an irreversible operation is performed. But if you're *sure* you want to delete the record, Option ⇧⌘E will avoid the dialog box.

loose fingers sink databases (JK)

When choosing *Delete Record* from the menu, be careful not to select *Delete Found Set* by accident. This an easy way to delete your whole file (as I've seen happen).

getting today's date (SA/JK)

FileMaker gives you three ways to insert today's date: you can use ⇧⌘- (from the *Paste Special* submenu of the Edit menu) to insert the current date into a field, you can type *Today* in a formula, or you can type a double slash

(//) in a layout. (You'll always see the double slash on the screen, but in Preview mode and in printouts, the current date will be substituted.)

But be aware that while both *Today* and // give you dates that change along with the calendar, the date you enter with ⌘- is static—so it remains the same as the date you inserted it, no matter when you subsequently open the file.

❦ *resizing in one direction* (SA/JK)

To change an object's position or size in Layout in only one direction (just vertically or just horizontally), hold down Shift while you drag on the object or its handle.

❦ *fast sizing & styling in layouts* (SA/JK)

When you use the Text tool in Layout mode to type field labels or enter other text, you'll get the currently selected font, size and type style. Don't tediously reset these options; it's faster to just copy and paste an existing label that has the settings that you want and then edit it.

Instead of cutting and pasting, you can also get a copy of any object on a layout by holding down Option and dragging it to another part of the layout. When you drag a field this way, you get a dialog box that lets you choose which field you want to appear in the new spot—it doesn't have to be the one you moved. This is an easy way to give several fields the same font and size.

❦ *overriding grids and magnets* (SA)

To move something in Layout without the movement being affected by the Grid or the magnetized T-squares, you don't have to turn them off—just hold down ⌘ while dragging.

❦ *default field entries* (SA)

The *List* option lets you pop up a list of suggested entries for any field. But let's say you have a field that's going to

be the same in most records (say, your local area code). In that case, use the *Auto-enter Data* option in the Entry Options dialog box. This puts the suggested item in the field automatically (you can change it in any record where it doesn't apply).

✎ *selecting from a list of values* (SA/SM)

When a field is formatted to display a list of values (possible entries), you don't have to scroll through the list to find the one you want. You can use the ↑ and ↓ keys to move through the list, or you can start typing the word you want; if it's in the list, it will be highlighted. As soon as that happens, you can stop typing and hit Return—you don't have to finish typing the whole word.

A list of values is only a *suggestion* list—you can always type something else in the field instead, or edit an entry that you choose from the list. If you want the field to be blank again, just select the information in it and hit Delete.

✎ *Relookup of a single record* (SA)

When you've changed information in a file that's used as a lookup (say, you've updated names and addresses that are looked up by your invoicing file), the *Relookup* command in the Edit menu updates all the records in your file. This wastes time when you only need to update the record you're looking at.

To force an update for only the current record, move to the field that does the lookup. Make a minor change to it—say, add a space and then delete it. When you move out of the lookup field, the "new" information in it will force a lookup and the rest of the record will be updated.

✎ *searching and sorting repeating fields* (SA)

FileMaker's special repeating field option (which gives you multiple entries in a single field) is great, but it's sometimes also confusing. For example, if you *sort* by a repeating

field, only its first entry is sorted on. But if you *search* for something in a repeated field, all its lines are searched.

cancelling repeating fields *(SA/JK)*

If you change your mind and don't want a field to be a repeating field, you don't have to delete it and start all over again. Just go to Layout, select the repeating field, choose *Field Format* from the Format menu, and type the number *1* in the dialog box that appears.

changed field names in formulas *(SA)*

If you change the name of one of your fields and it's used in a calculation in some other field, you don't have to go back and change the name in the formula—it's changed automatically.

adding record numbers *(SA/JK)*

If you use the *Auto-enter serial number* option when you're defining a field, each new record gets a number one higher than the previous record. Unfortunately, when you import records from another source, numbers aren't assigned in such a serial field—it stays blank.

If you've imported a few hundred (or more) records, you certainly don't want to manually enter numbers for all of them. Here's the shortcut:

Use a spreadsheet to create a column of numbers as long as you need for your records. (Use 500 rows for 500 records.) Put a *1* (or whatever your starting number is) in the first cell and in the second cell use a formula that adds 1 to the number in the cell above. Copy this formula down through as many rows as you need—you'll wind up with a column of numbers in increments of one.

Save the spreadsheet as text and then go back to FileMaker. Use the *Import...* command to insert the list of numbers directly into the serial field (make sure you

specify *Replace data in current found set* instead of *Add new records).* If you care which numbers go into which records, sort or otherwise arrange the records in FileMaker before you do the import.

Then go to the *Auto-enter serial number* option and set the serial number to one greater than the highest serial number you imported, so that new records will be numbered correctly.

alphabetizing by last name *(SA)*

Here's a way to alphabetize records by last name even when you've got both first and last names in a single field. There are a few different approaches, depending on the complexity of your problem—just how many separate words might be in the name field, for example.

In every case, though, you'll be defining a new field—*LastName*—that you'll eventually sort on. *LastName* doesn't have to be a part of any layout, so it won't clutter up your screen or printout; as long as it exists, you'll be able to sort by it.

If all your *Name* fields contain just first and last names, the *LastName* field can contain a simple formula that takes the length of the entry in the *Name* field, subtracts from it the position of the space, and uses the *right* function to give you all the letters that follow the space:

```
LastName=
right(Name,length(Name)-position(Name," ",1))
```

You need a more complicated approach when you have to deal with the possibility of three different names (maybe a middle name or initial) in the *Name* field. The *if* formula below takes care of that by using nested position functions to start the search for a possible second space after the position of the first space found:

```
if(position(Name," ",position(Name," ",1)+2) >1
   ,right(Name, Length (Name)-position (Name," ",position
   (Name," ",1)+2)),right (Name,Length (Name)-position
   (Name," ",1)))
```

With this formula, *Jones* would be extracted from *John Paul Jones* and *Fields* from *W. C. Fields.*

formatting phone numbers *(SA)*

Unfortunately, FileMaker can't define a field to contain a phone number format—(201) 555-1234 or 201/555-1234. But you can "read" the phone number from the field in which it's entered, format it the way you want it, and put the result in another field.

First, define a numeric *PhoneEnter* field. Then, no matter how the phone number is typed in—with or without dashes, slashes or parentheses, the field is going to store only the digits (2015551234, for example), because all the non-numeric characters will be stripped out.

Next, you make another field, *ShowPhone*, to display the phone number. Make it a calculated field and use this formula to get the numbers from the PhoneEnter field and format them:

```
ShowPhone=
"(" & left(PhoneEnter,3) & ")" & middle(PhoneEnter,4,3) &"-"
   & right(PhoneEnter,4)
```

This puts parentheses around the area code and a hyphen after the exchange. If you want the area code separated from the rest of the number by a slash, use this formula instead:

```
left(PhoneEnter,3)&"/"&middle(PhoneEnter,4,3) &"-" &
   right(PhoneEnter,4)
```

If you want to set up the formula to allow for the possibility that some phone numbers will be entered without

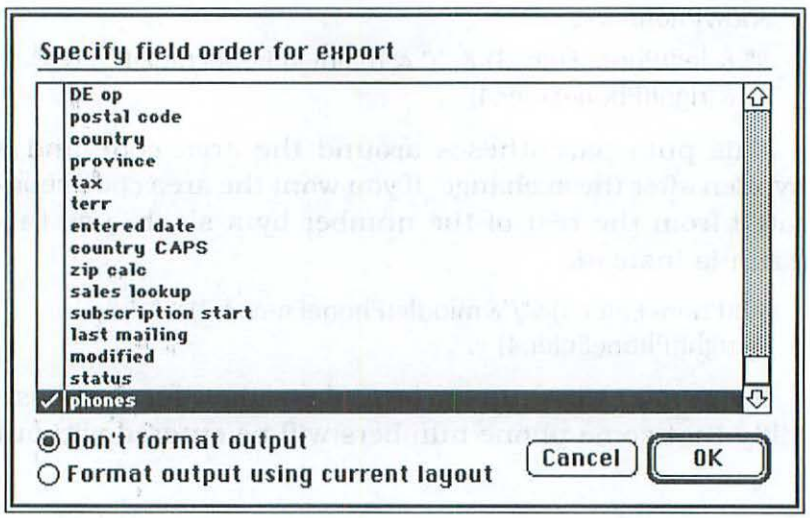
area codes, use an *if* statement to check the number of digits in the PhoneEnter field:

```
ShowPhone=
if(length(PhoneEnter)>9,"(" & left(PhoneEnter,3) & ")" &
    middle(PhoneEnter,4,3) & "-" &
    right(PhoneEnter,4),left(PhoneEnter,3) & "-" &
    right(PhoneEnter,4)
```

splitting & combining repeating field entries (SA/JK)

Let's say you've designed a database with a repeating field (say, for phone numbers—work, home and fax). Now you want those three items of information in three separate fields. Here's what you do:

First, export the information from the repeating field into a text file. Choose *Export...* from the File menu and, in the dialog box that follows, give the file a name, accept the *Tab Separated Text* option and click the *New* button. In the next dialog box (shown), deselect all the fields except the phone number field by removing the checkmarks next to their names with the pointer. Make sure the *Don't format output* button is selected, then click the *OK* button.



Next, open the file in Word. You'll see each group of phone numbers on its own line, with boxes between the phone numbers:

555-6985□555-8721□555-3287
555-2378□555-1245□555-3641
555-1286□555-3491□555-6398
555-3678□555-9743□555-9312

The box is the character that FileMaker uses to separate items of information in repeating fields. Since the Tab character is used to separate information in *separate* fields, you have to replace each box with a Tab. But don't do it manually—let Word do the work.

The box character has an ASCII code of 29. Since Word can search and replace based on ASCII codes, this is a cinch. Use the *Replace...* command and in the *Find What* box, type *^29.* (You get the caret, ^, with Shift 6.) In the *Replace With* box, type *^t* for Tab. Click the *Change All* button to make the changes.

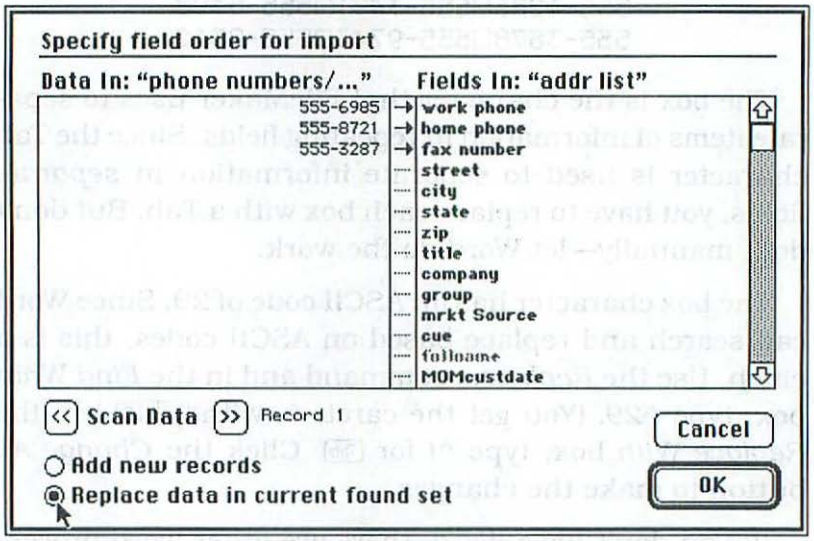
(If you don't have Word, there are other word processors—like Nisus—that can handle this, even without ASCII codes; you just need to be able to copy and paste FileMaker's box character into the program's *Find* box, and the program must provide some way of replacing it with a Tab character.)

Next save the file. (Since it was a text-only file when you opened it, Word defaults to text-only when you save it, which is just what you need.)

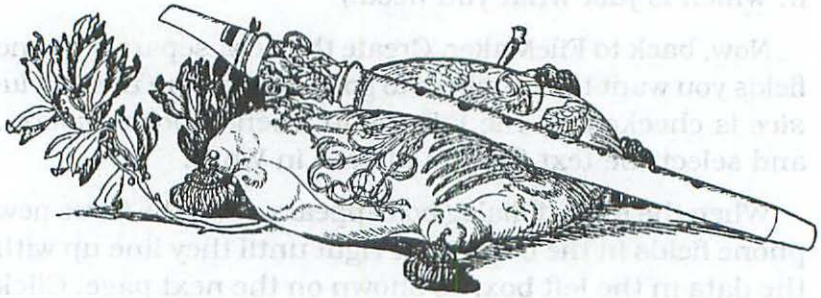
Now, back to FileMaker. Create the new, separate phone fields you want the numbers to go in. Make sure that *Exclusive* is checked on the File menu, then choose *Import...* and select the text file you altered in Word.

When the Import dialog box appears, drag the three new phone fields in the box on the right until they line up with the data in the left box, as shown on the next page. Click

in the column between the boxes so that arrows appear between the data and the phone fields. Then click the *Replace data...* button and the *OK* button. All the information that used to be in the phones field is now split among the three new fields.



Now let's say you have the opposite problem—you have separate fields that you want combined as entries into a single repeating field. You do basically the same thing, but change all the Tabs that will be in the text file into the special code 29 box character. Just reverse the information in the Replace dialog box—put ^*t* in the *Find what* box and ^*29* in the *Change to.*



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Chapter 11

Spreadsheets

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Spreadsheet programs (and accessories)

spreadsheet basics (SA/AN/SM)

mostly for beginners

A spreadsheet is a grid of *cells* (little boxes) that are arranged in (horizontal) *rows* and (vertical) *columns*. You put numbers in the cells and tell the spreadsheet to perform mathematical operations on them.

Let's say you create a column that represents your monthly budget, with the first cell for rent or mortgage, the next for utilities, the next for food, and so on. Then you put twelve of those columns next to each other, one for each month of the year. Such a spreadsheet can calculate your budget for each month (the total of each column) and how much you spent—or plan to spend—in any given category in the course of a year (the total of each row). You can also have a total calculated for all categories in the entire year, and averages for categories or months.

very good feature

The great strength of spreadsheets is that if you change a number in one spot, every other number that depends on it is recalculated automatically. So if you change the utility cost for May (when your lover will be in Italy and you'll be making many long passionate international phone calls), the total for May will change, and so will the yearly total for utilities, the yearly total for all categories, the average monthly budget, and any other calculations you've set up.

That's the key to the spreadsheet's *what-if* capability—you can change a number or two and see what effects it has. For example, you can figure out how large a mortgage you can afford at various rates of interest, or how much profit you'll make if you sell 1000, 5000 or 10,000 of a product.

Spreadsheets have other uses as well. Since you can put text as well as numbers in cells, spreadsheets provide an easy way to lay out complicated tables, even if you don't have them do any calculations. And most spreadsheets can also create charts, which can be very useful, since numbers are more easily understood when presented graphically.

(A *spreadsheet* is the document you create and a *spreadsheet program* is the software that creates it, but the program is also commonly called a *spreadsheet*—just as a database program is often simply called a *database.)*

Excel *(SA)*

Excel is fast, has a powerful macro editor and handles all sorts of charts. It's still far and away the most popular of Mac spreadsheets, partly because it has a lot of good features and partly just because it's *been* the most popular of Mac spreadsheets for a long time and lots of people are used to it.

Excel 3 *(CS)*

Excel 3 offered some nice new features beyond those in the previous version, 2.2. It introduced:

very good feature

shortcut

very good feature

- outlining, which helps organize complex spreadsheets
- Styles, like those in Word, for formatting
- a decent assortment of 3D charts
- the ToolBar (an idea swiped from Full Impact), which makes most common operations available with a single mouse-click
- a tool called Solver, which works backwards from a result to the data that produces it (for example, instead of finding the mortgage payment for a given loan amount and interest rate, you can enter the payment you want and have the program tell you the various prices and interest rates that will generate it)

For info on the next version, Excel 4, see the next entry.

Excel 4 (CS/AN)

As we write this, Microsoft is about to introduce the $500 Mac version of Excel 4 (the Windows version was released earlier). Rather than offering powerful new functions, of which it already has plenty, Excel 4's new features deal primarily with ease-of-use and formatting. That's great, since formatting has always been Excel's weakest area, with ease-of-use (or, rather, lack thereof) second.

- *Drag and drop* lets you move blocks of cells around the spreadsheet by dragging.
- The new *Autofill...* command is smarter than the old *Series...* command. If you type, say, *January '93* into the first cell of a selected series of cells, it will know to put *February '93* in the second cell, and so on. Or you can type *1st Quarter* and it will give you *2nd Quarter, 3rd Quarter* and *4th Quarter.*

- Excel's sometimes awkward charting procedures haven't been streamlined, but little instructional aids called Wizards have been added to guide you through the charting process and other complex tasks. There are also shortcut menus that pop up automatically in certain contexts to help speed up repetitive tasks.
- The main difference between Excel 3 and 4 is customizability. For instance, you can create your own icons, put them on the ToolBar and use them to activate macros or frequently used commands.

Resolve (CS)

Claris bought a spreadsheet called Wingz and renamed it Resolve. They made it easier to use but didn't change much else. Resolve ($250 list) has better 3D charts—including wireframes and polar plots—than Excel. The charts are easy to set up, but Resolve takes a fairly long time to draw them (although it's faster than Excel on many calculations).

Resolve's scripting language is more English-like than Excel's macros, and it's better for automating small-scale personal tasks like designing forms, creating special formats for blocks of cells and customizing searches. For programming large, commercial-quality templates, Excel has advantages—particularly its debugging system—but its macros are harder to learn.

Resolve's manuals are actually written to be read, and its interface is similar to other Claris products. On the other hand, it's easier to swap Excel spreadsheets with PC users, and there are so many Excel consultants and user groups that you'll always have someplace to turn for help (although with Resolve, you're less likely to need it). Excel also has many more templates, macro collections and other add-on products. But then, Resolve costs half as much.

1-2-3 *(CS)*

Since 1982, 1-2-3 has been far and away the largest selling spreadsheet on the PC—there now are about sixteen million registered users. After years of unsuccessful Mac experimentation (including an ill-fated program called Jazz), Lotus (1-2-3's developer) has finally come up with a Mac version of 1-2-3 ($500 list) that does nearly everything right.

1-2-3 for the Mac has left its wretched PC interface behind (although the masochists among you can call it up if you want); its commands are Maclike and easy to learn. The help and graphing capabilities are great, and the range of functions is impressive (although Excel has a few more). 1-2-3 can even use macros created in Excel 2.2 and 1-2-3 for the PC. It's a bit slower than Excel or Resolve at recalculation, but that's about all that's wrong with it.

If you work with people who use 1-2-3 for the PC, 1-2-3 for the Mac is a better choice than Excel. But if most of

the computers you come in contact with are Macs, there isn't a compelling reason to switch from Excel.

You have to admire Lotus's spirit, stepping into an arena littered with the bones of Full Impact, RagTime and Wingz, but Lotus's marketing clout alone will probably guarantee 1-2-3 a permanent place in the Mac world.

✎ *MacCalc* (SA)

This gem of a program fills the bill for lots of personal spreadsheet users. It has no charting capabilities and is small (999 rows by 124 columns) compared to Excel, Resolve and 1-2-3, but it's incredibly fast. It lets you assign different fonts, styles and even notes to cells—all for just $140 list. If you need a basic spreadsheet program but have no use for the other modules in an integrated program, MacCalc is the answer.

✎ *PowerMacros for the Excel user* (SS)

If you don't have the time or patience to learn how to create macros yourself, you can buy canned macros (sort of like clip art for a spreadsheet). Individual Software's PowerMacros ($50 list) range from the simple and obvious (removing all borders, or removing the outline from a selection) to the interesting (charting a biorhythm or creating a recalculation timer) to the supremely useful (creating a new database or defining hot spots). All in all, they can vastly simplify your day-to-day work with Excel.

Each of these macros can be executed in two or three ways. They can all be accessed with the *Run...* command on the Macro menu, or you can run the Macro Launcher (itself one of the 131 macros). It opens a dialog box into which you type the macro's 1–3 character "short name." Finally, almost half the macros can also be called up with preassigned Option-⌘ key combinations.

PowerMacros gives you a quick reference guide that lists each macro's short name and Option-⌘ key combination.

If the manual's not handy, there's even a macro that will recreate the list for you as an Excel spreadsheet.

The excellent manual keeps things simple by describing each macro in the same, organized manner. Since each macro description is completely self-contained, after reading the first four chapters of the manual (30 pages), you can skip immediately to the macros that interest you. A few of my personal favorites swap two columns (or two rows), toggle between two hot spots, save all spreadsheets and change zeros to blanks.

Admittedly, several of the macros—most of those for formatting, alignment and borders, for example—could easily be created using Excel's macro recorder. Others, however, would require fairly sophisticated macro programming skills. So even if you're a macro hot-shot, this package will save you an enormous amount of work—both in programming effort and in efficiency gained from using the macros. After all, why reinvent the wheel simply because you can?

Excellence *(AN)*

Getting the most out of Excel takes a lot of advice and one way to get it is by subscribing to *Excellence*, a monthly journal of tips and tricks published by the Cobb Group. It costs $60 a year, so you'll only want to do that if you make fairly extensive use of Excel; if you do, *Excellence* should be a real help.

General spreadsheet tips

dividing spreadsheets logically *(AN/DC)*

Rather than just letting page breaks fall wherever they may on your spreadsheet, organize your data so that logically related information is grouped together on the

same page (by spacing it out with blank cells). In addition to making the spreadsheet easier to understand on the screen, this approach also lets you print out selected portions of the data simply by specifying the pages you want in the Print dialog box.

displayed vs. stored numbers *(SA)*

In a spreadsheet, the format you set for numbers only affects how they appear, not their actual stored values. If the number in a cell is 1.457 and you've formatted the cell for two decimal places, you'll see 1.45 or 1.46 (some spreadsheets truncate numbers and some round them). In either case, the spreadsheet remembers that the number you entered in the cell is actually 1.457 and uses that number in any calculation.

This can lead to some confusion. For example, you might have the numbers 1.23, 9.18 and 8.32 in three cells, which add up to 18.73. If you've formatted all four cells for no decimal places, you'll see 1 + 9 + 8 = 19. Remember this when you see calculations that don't seem to be coming out right.

turn off curly quotes *(SA)*

If you use a utility like Quote Init or SmartKeys that automatically substitutes curly quotes for straight quotes, turn it off when you're working in a spreadsheet. Spreadsheets accept only straight quotes in formulas.

freezing numbers *(SA/SM)*

Let's say you've created a spreadsheet to take care of your checking account. Instead of typing in every check number, you've created a formula (or used a command) that adds 1 to the value in the cell above as it goes down a column. That works fine until you have a break in the series (for a deposit, maybe) or until you do some sorting (to pull out certain expenses, say). This doesn't mean you have

to type in the check numbers one at a time; you can freeze the numbers after the formula has created them.

To do that, select and cut the cells that contain the check numbers, click in the cell where you want them to begin (which can be the same place you just cut them from) and choose the command that lets you paste only the *values* rather than the *formulas* (in Excel, it's the *Paste Special* command on the Edit menu).

save time with manual calculation *(SA/SM)*

Most spreadsheets have an automatic calculation mode that recalculates the entire spreadsheet each time you change an entry (or create a new one). This can waste a lot of time. The shortcut? Switch to manual calculation, make all your changes, and then either tell the spreadsheet to manually calculate or turn automatic calculation back on.

This isn't always necessary, since some spreadsheet programs, like Excel, only recalculate the affected cells—but if you're working in cells that are part of a large calculation (involving many other cells or linked spreadsheets), using manual calculation still speeds things up.

relative vs. absolute cell references *(SA)*

When you refer to a cell in a formula, the spreadsheet thinks of it *relatively*—that is, as the cell that's three columns to the left and two rows above the cell where the formula is. That's so the formula will still work if you copy it to a new cell (a sum, for example, will add up the cells above it, rather than the cells above the cell where the formula was copied from).

Sometimes, though, you don't want cell references to change when you move a formula—you want them to be identified by their actual, *absolute* locations (*A1, 4F* or whatever). To do that, put dollar signs before both the column and the row—for example, *4F*. You can also make

just the column, or just the row, absolute—for example, *A$2* or *$B14*.

You can type the dollar signs in yourself, but most programs also have a command that does it. In Excel, for example, it's the *Reference* command in the Formula menu.

priority of operations *(SA/SM/Hal Lewis)*

In a spreadsheet formula, some operations have a higher priority than others, and are performed first no matter where they are in the formula. Operations of equal priority are performed left to right. For example, addition and subtraction are of equal priority, so 5–3+2 equals 4 (if it were calculated right to left, the result would be zero).

Multiplication and division are of equal priority to each other but are of higher priority than addition or subtraction. So 5+3*2 equals 11, not 16 (because the multiplication is performed before the addition). You can override the natural priorities by using parentheses: operations within parentheses are always performed before operations outside of them. So (5+3)*2 equals 16.

As with other equal-priority operations, if you have multiple parenthetical operations, they're performed left to right. If you have nested parentheses, the innermost parenthetical operations are done first. It works like this:

First:	innermost parentheses	$5 + [10 + (6 - 1) \times 4] \,/\, 2$
Second:	multiplication (in parentheses)	$5 + [10 + \mathbf{5} \times 4] \,/\, 2$
Third:	parentheses	$5 + [10 + \mathbf{20}] \,/\, 2$
Fourth:	division	$5 + \mathbf{30} \,/\, 2$
Fifth:	addition	$5 + \mathbf{15}$
Sixth:	total	**20**

Excel tips

All these tips work with Excel 3 and 2.2. Many work with Excel 1.5, and most will probably work with Excel 4.

learning Excel *(AN)*

mostly for beginners

Excel's manuals have gotten pretty good; the one for Excel 3 even has a good index! (It does have some failings however; for example, it doesn't always tell you what menu a command is on.) Excel's help screens are also good.

[So is balloon help under System 7. In fact, you may want to leave it turned on when you're first learning Excel.—CS]

[I can't imagine anyone leaving balloon help turned on, no matter how good it is.—SM]

[That's just because you're so high-strung, Susan. Balloons constantly popping up all over the screen don't bother spiritually centered, highly evolved people like myself.—AN]

[I'm high-strung!? You're like a horse escaping from a burning stable.—SM]

short vs. full menus *(Marty Sobin/AN)*

mostly for beginners

Excel's *Short Menus* command (on the Options menu) removes commands that are less often used, and the *Full Menus* command restores them. So if you can't find a command you're looking for, make sure that the command in the Options menu reads *Short Menus* (which means Full Menus is on).

selecting the whole spreadsheet *(DC/AN)*

shortcut

To select all the cells in most spreadsheets, click in the box in the extreme upper left corner—that is, above the number *1* and to the left of the letter *A*.

previews of printouts (AN)

One of Excel's nice features is the ability to preview on the screen what printouts will look like on paper (by choosing *Print Preview* from the File menu or by clicking the *Print Preview* checkbox in the Print dialog box). If the text in the Preview window is too small to read, you can zoom in on any part of it by clicking with the magnifying-glass pointer. You can move around while zoomed in by using the scroll bars. Click again and you're back at the overall view of the page.

Unfortunately, this doesn't work on big screens. If Excel thinks it's showing you the whole page actual size, it won't let you zoom in on it to see details.

shortcuts for inserting columns and rows (SA/AN)

There are faster ways than the *Insert* command to insert a row or column. ⌘I inserts a new row above, or a new column to the left of, the selected one. Option-clicking on a row number inserts a new row above it, and Option-clicking on a column letter inserts a new column to the left of it. Option-clicking in a cell inserts a new row above it.

adjusting columns and rows (SA/SM/AN/Hal Lewis)

When you put the pointer on, or slightly to the left of, the dividing line between column headings (*A*, *B*, etc.), it changes to a thick vertical line with arrows pointing right and left. Now you can drag the column to the left of this dividing line to make it wider or narrower.

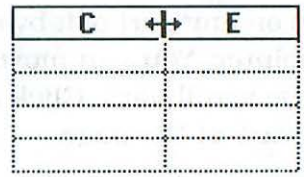
When you put the pointer on, or slightly above, the dividing line between row headings (*1*, *2*, etc.), it changes to a thick horizontal line with arrows pointing up and down. Now you can drag the row above this dividing line to make it wider or narrower.

When you've hidden a column or row (like D in the illustration on the next page), put the pointer slightly to the

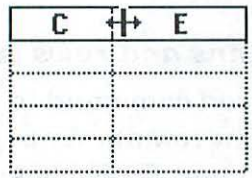
right of, or slightly *below*, the dividing line between the visible column or row and the hidden one. *Now* dragging right or down will open up the hidden column or row, instead of widening the visible column or row.

Start dragging here . . .

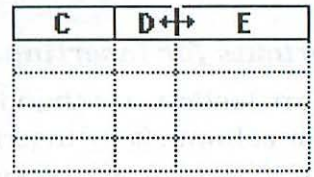
. . . and column C gets wider.



Start dragging here . . .



. . . to reveal hidden column D.



outlining cells *(AN/SA)*

mostly for beginners

Although it's right there in the Border dialog box (on the Format menu), many Excel users don't realize that they can outline a cell they've selected simply by clicking on *Outline*. This is a lot easier than clicking on *Left*, *Top*, *Right* and *Bottom* all the time.

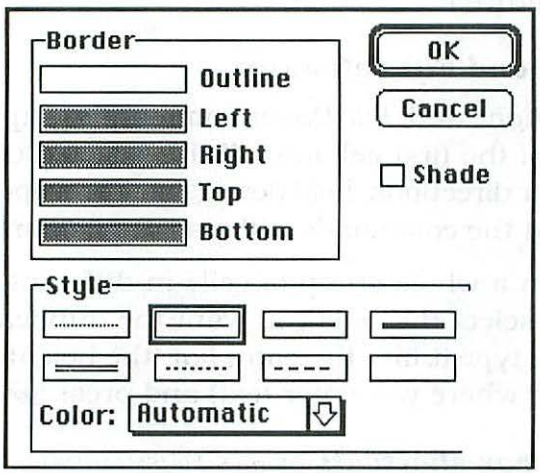
shortcut

If you're working with a group of selected cells, *Outline* borders the group as a whole, not each individual cell within it. There's even a keyboard command for outlining a cell or group: Option ⌘ 0 (zero).

clearing borders *(AN)*

Dress neatly, don't appear nervous...no, wait a minute, that's the wrong context. I'm supposed to be telling you how to clear all the borders from a group of cells (or a single cell, for that matter).

Let's say you've put in lots of borders, then moved things around on the spreadsheet. The borders will now look like something Mondrian painted when he was suicidally depressed. Before you can put new borders in, you have to remove these old ones. So you select the cells and choose *Border...* from the Format menu. It produces a dialog box that looks like this:



There should be a button in this dialog box that says *Clear*, but there isn't. If the *Left*, *Right*, *Top* and *Bottom* border boxes are gray—meaning that some of the selected cells have each of those borders and some don't—you'll have to click *eight* times just to clear the existing borders—one to get a solid line in each box, once more to remove it. If I wanted to click eight times, I would have become a tap dancer.

Since there isn't a *Clear* button, be glad that at least there's a keyboard command: Option ⌘ - (hyphen, but think of it as a minus sign). I've been looking for this command for years, but just found it, because Excel finally has a good manual.

✎ *seeing the borders* (AN)

Sometimes it's hard to see what borders you've drawn in an Excel spreadsheet. An easy and fast way to make them more visible is simply to select the area you're interested in; the borders show up much more prominently when they're white against a black background. *(Print Preview* takes a bit more time, but it does give you a clearer picture.)

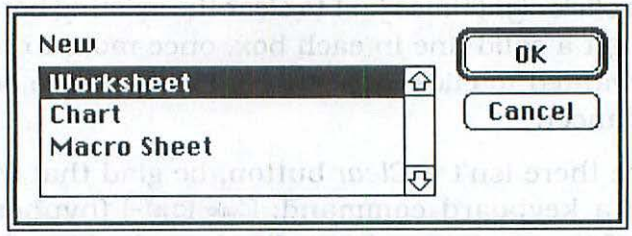
✎ *Fill Up and Fill Left* (SA/AN)

The *Fill Right* and *Fill Down* commands duplicate the contents of the first cell into all the selected cells. To go in the other directions, hold down Shift as you open the Edit menu, and the commands will read *Fill Left* and *Fill Up.*

To fill in a whole group of cells in different rows and columns, select the cells you want the duplicated information in, type it into the *entry bar* (the box at the top of the screen where you enter text) and press Option Enter.

✎ *dialog box shortcuts* (Marty Sobin/SM/AN/ND)

To open an item in an Excel list box, type the first letter of its name and hit Return. For example, here's the dialog box you get when you choose *New...* from the File menu (or press ⇧⌘N):



Let's say you want to create a new chart. Instead of selecting *New...* from the File menu, clicking on *Chart* and then clicking on *OK*, just hit type ⇧⌘N (to open the New

dialog box), C (to select *Chart*), and then Return (to open a chart) as fast as you can and the chart will appear.

a bouquet of Excel shortcuts *(SA/Bob Umlas/Marty Sobin)*

- ⌘Y repeats the last thing you did. This is especially useful for repeating something you did in a dialog box without having to open the dialog box again.

- ⌘U activates the entry bar and places the insertion point at the end of the data there.

- There are three ways to cancel any change in the entry bar: clicking on the *X* icon to the left of it, or hitting ⌘. or Esc.

- The *Calculate Now* command on the Options menu affects all open spreadsheets, but if you hold down Shift before you open the menu, only the current spreadsheet is recalculated.

using ⌘B for Clear *(Marty Sobin)*

When you choose *Clear* from the Edit menu, you're given four choices of what you want to clear: *All*, *Formats*, *Formulas* or *Notes*. When you use the ⌘B keyboard equivalent, though, the options dialog box doesn't appear and you don't get a choice—the contents of the cell disappear but the formatting and cell notes remain.

paste shortcut *(SA/AN)*

Pressing Enter after you've cut or copied pastes the contents of the Clipboard into whatever cell(s) you have selected. But you can't do multiple pastes with this technique; unlike an ordinary Paste, Enter-Paste deselects the original cells and also empties the Clipboard.

importing spreadsheets from large screens *(DC/AN)*

If you import an Excel spreadsheet created on a modular Mac with a large monitor to a compact Mac with a 9" screen (or from any bigger screen to any smaller screen), the spreadsheet's window may be larger than the screen,

and you probably won't be able to resize it, because the size box will be off the screen. The solution is simple: just double-click on the title bar and the window will automatically resize to fit the current screen.

❦ *zooming in and out* (SA/DC/ND/AN)

To get an overall picture of a large spreadsheet, change the size of the Normal font to two or four points. To do that, select *Style* from the Format menu, click the *Define>>* button, then the *Font...*, button, then type in the new font size. You won't be able to work in this view, but you can get a good feel for where everything is.

Even better, create a pair of macros to zoom out and in by recording your moves as you shrink the type size and then restore it to original size. Put these macros in the Excel Startup document (described below) so they'll always be available.

❦ *localized scrolling* (SA)

Excel normally scrolls you through just the part of the spreadsheet you're using, not through the whole thing. So if the last cell with anything in it is in row 100, putting the vertical scroll box in the middle of the scroll bar will move you to row 50, not row 8192. (It works the same way for columns.)

To get the scroll bar to represent the entire (possible) spreadsheet—all 4.2 million cells of it—hold Shift down while you drag the box or click in the bar.

❦ *cycling through opened spreadsheets* (Marty Sobin)

You don't have to go to the Windows menu to cycle through the spreadsheets you have open. ⌘M takes you to the next window in the stack, and Shift⌘M takes you to the previous one.

selecting noncontiguous cells (SA)

Excel lets you select *noncontiguous* cells or groups of cells (that is, ones that don't touch each other). Just hold down ⌘ while you click in or drag through cells in different parts of the spreadsheet. Each ⌘-click adds the current cell choice to the selection but, unlike Shift-clicking, it ignores the cells in between.

The *Select Special* command also lets you select noncontiguous cells, but only in categories like *all the cells with formulas* or *all the blank cells.*

one use of cell protection (DC/AN)

If you're designing a spreadsheet into which various people will frequently input data, you'll want to protect the cells that contain the constant text or formulas so they don't accidentally get changed. Here's how to do that:

With the document unprotected, select the cells where the data is to be entered. Use the *Cell Protection* command (on the Format menu) to unlock them. Then choose *Protect Document* from the Options menu and enter a password as prompted. This will lock all the cells that have not been selected.

Once the document is protected, only the unprotected cells can be used. This means that the normal methods of moving from one cell to another, like Tab and Return, will move you directly from one data-entry cell to the next, jumping over all the locked cells that can't be used.

the Close All command (CS)

In early versions of Excel, there was a *Close All* command on the File menu. To get that command in Excel 3, hold Shift down before opening the menu.

escaping from cells with invalid formulas (DC/AN)

mostly for beginners

Excel won't let you exit a cell until the formula in it makes sense (you'll keep getting the *Error in formula* message).

This can be maddening when you're working on a complex formula and can't seem to get it right.

The way out is easy—just remove the equal sign at the beginning of the formula. Excel will now treat the entry as text and won't analyze it for correctness. After a while away from the troublesome formula, you may be able to go back to it and spot your mistake.

checking the spelling of functions *(Marty Sobin)*

If you type the name of a function in the entry bar rather than using the *Paste Function* command, you run the risk of misspelling it. *[Yeah, I'm always typing* AVG *instead of* AVERAGE.*—AN]* The trick is to type the name in lowercase letters. Correct function names are converted to all caps when you hit Return or Enter, so if a lowercase name doesn't convert to all caps, you know it's wrong.

calculating part of a formula *(Marty Sobin/SM)*

You can calculate part of a formula by selecting it and hitting ⌘=. That part is immediately converted to a value:

=SUM(B1:B12) / 12
=SUM(B1:B12) / 12
=172 / 12

If you want the value to remain, hit Return, or edit it further first. If you wanted only a sneak preview of that part of the formula, cancel the calculation (by hitting ⌘., ⌘Z or Esc, or by selecting *Undo Typing* from the Edit menu) before you do anything else, and it will return to its original state.

looking at both values & formulas *(Marty Sobin/SA/AN)*

There's an easy way to simultaneously view the formulas in your spreadsheet and the values that result from them. Choose *New Window* from the Window menu, format the second window that opens to display formulas,

and format the window you were working on to display values (or vice versa). Then just display both windows side by side.

time and date functions *(DC/Fokko Du Cloux/ND)*

Use the *NOW( )* function to retrieve the current date and time from the system clock and enter it into a formula as a serial number. Use the following functions to convert the serial number to the format you need: DAY, WEEKDAY, HOUR, MINUTE, MONTH, YEAR. For example, the formula =HOUR(NOW()) gives you the current hour.

You choose how the date or time appears. For example, if you specify *m/d/yyyy* (with the *Number...* command on the Format menu), you'll get it in this form: *5/12/1989*. If you specify *dddd*, you'll get just the day of the week. *Mmmm* will give you the month written out in full and *hh:mm am/pm* the time in this form: *22:01 pm*.

counting things *(Marty Sobin/Todd Corleto)*

The COUNT function merely tells you how many cells in a given range contain numbers. To find out how many times a specific *item* appears, use this formula:

=SUM(IF(C8:F14="YES",1,0)), followed by ⇧⌘Return

This tells you how many times the number or text—in this example, *YES*—appears. (Numbers don't go in quotes, and must be in a continuous range.)

notes about notes *(Bob Umlas/SA/AN)*

Excel lets you attach notes to cells, to help you remember what you were thinking of when you wrote the formula (sort of like comments in a program). To attach a note window to the cell you're in, use the *Note...* command on the Formula menu or press Shift⇧⌘N.

Pressing Return closes the Notes dialog box. To move down a line within it, use Option Return. When the Notes window is

open, you can scroll your spreadsheet in the background—if the insertion point is in the *Cell* text box but not if it's in the *Note* text box!

Shift ⌘ O selects all the cells in the spreadsheet that have notes. To review them, choose *Show Info*, then *Arrange All* (both on the Windows menu). Click on the spreadsheet window and use Enter to jump from one cell to the next. As you do, the notes you made will be displayed in the Info window.

the Excel Startup document *(Bob Umlas/SA)*

You can create a spreadsheet that automatically opens when Excel is started—just name it *Excel Startup* and put it in the System Folder. The best use of this startup document is to put all the macros that you use most often in it—since the spreadsheet will be open, they'll all be available to you.

To make this document more convenient, choose *Hide* from the Windows menu. This keeps screen clutter to a minimum, and Excel will find the macros whether the document is hidden or not. To keep it from closing if you give a *Close All* command, click in it (to make it active), choose *Protect Document* from the Options menu and click on the *Windows* button.

speeding up macros *(Marty Sobin/Lee Hinde)*

The *Echo(False)* feature greatly speeds up the execution of macros (it particularly makes a difference in long ones). One of Lee's macros that takes two minutes without *Echo(False)* takes just fifteen seconds with it. (Just put *Echo(False)* at the beginning of the macro.)

Echo(False) works by turning off screen redrawing. (By the way, you don't need to reset Echo at the end of the macro so that screen redrawing will be turned on again; Excel does that automatically.)

But if your macro involves several spreadsheets, there's a delay that *Echo(False)* doesn't prevent; each spreadsheet is activated when it's called and even though the contents of the spreadsheet aren't drawn on the screen, the window itself coming to the top of the pile slows things down. So before you run a macro involving a spreadsheet other than the active one, use *HIDE( )* to hide it—and use *ACTIVATE( )* when you're finished.

references in linked spreadsheets *(Marty Sobin)*

If you move the contents of a cell that's referenced in a link, the reference won't be followed—that is, if Spreadsheet A references cell A12 in Spreadsheet B and you move the contents of A12 someplace else, Spreadsheet A is still going to look at cell A12—and not find anything there (or find something it didn't expect).

If however, you reference a cell by its *name* (the *Define Name* command lets you name it), you can move its contents around and the linked spreadsheet will find it—because a cell's name moves along with its contents.

circular reference problems *(Bob Umlas/SA)*

When you get a *circular reference* alert, it's easy to look through all the cells that are involved. Select the problem cell(s) (they'll be identified in the alert box), choose the *Select Special* command and click either the *Precedents* or *Dependents* button (click *All levels* too). *Precedents* selects all the cells on which the current cell depends; *Dependents* selects all the cells that depend on the current cell.

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Chapter 12

Personal and business management

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Address book programs

Address Book Plus and Dynodex (SS)

Address Book Plus ($100 from Power Up) and Dynodex ($125 from Portfolio) are the two most popular commercial address book programs on the Mac. Both come as stand-alone applications and as DAs, and both allow up to four phone numbers per name.

Data entry goes quickly in Dynodex, but it imports and exports information only through tab- or comma-delimited files. Plan on spending the better part of a day converting your files if your existing address file is free-form (not organized in fields).

Address Book Plus has more built-in printing layouts than Dynodex, including brand-name organizers (like Filofax, Day Timer, Lefax and Day Runner), mini address books, envelopes, Rolodex-style cards and more than 70 types of labels! You can also design custom layouts. I had some trouble importing my address file, though; I advise keeping your import data as simple as possible, and proofreading the file carefully afterward.

Both programs do double-sided printing, but Dynodex's manual explains the process better. Dynodex is a bit faster in the versions I tried, and it has a cleaner interface. But if you want a file that you can use on your Mac *and* a hand-held personal organizer like the Sharp Wizard, go with Address Book Plus.

Dynodex (AN)

I've been using Dynodex for years. I love being able to print out new address books instead of having to rewrite them periodically. But there are several things that annoy me about the product. It's formatting is screwy and hard to figure out (although powerful once you do find your way around it). Importing data is a nightmare (apparently it

is in Address Book Plus too) and the special paper Portfolio sells is way too expensive. Dynodex's manual has a lousy index, but the telephone support is pretty good (you'll probably need it).

I don't want to slam Dynodex just because my familiarity with it has revealed its flaws; no doubt the alternatives to it described in this section have irritating failings of their own. For all it's annoyances, I totally depend on the program, and love the address books that I now, after some difficulty, can get it to produce.

Address Book *(Chris Allen)*

Address Book (not to be confused with Address Book Plus, described in the first entry) is a handy little $20 shareware database program and DA by Jim Leitch that's specifically designed for storing names, addresses and telephone numbers. Address Book will also dial any phone number in its files at a click of the mouse, either directly onto your modem or by generating tones on the Mac's speaker.

Address Book's main limitation is that it doesn't print, but you can export it to a text file which can be printed by any word processor. Address Book is included on *The Macintosh Bible Software Disks, Fourth Edition,* which are described at the end of Chapter 20.

InTouch *(SS)*

This $70 DA from Advanced Software can print individual envelopes and mailing labels. You can add graphics and specify a different font, size and style for the address, return address, postal bar code and message (e.g. *Attn: Family Values Enforcement Squad).*

InTouch doesn't store records in any particular order, and you usually search to find what you want. This happens very quickly—searches never take more than a second or two on my 400-record InTouch database.

InTouch can't print phone directories, address books or more than one label or envelope at a time, but as an electronic Rolodex, it's great (it can even dial the phone for you). I've used it for the past several years, and it's the one DA I can't do without.

Schedule managers

DayMaker *(Lofty Becker)*

DayMaker ($100 list, from Pastel Development) is a calendar and alarm program that keeps to-do lists, maintains project schedules, serves as a basic address book and lets you take notes. It's easy to use, with many options, but it can be slow as its files get larger, and the current version only allows you to input unformatted text like names and addresses. Even worse, you can only choose one font, size and style per view (list, day, week or month), which means you can't use fonts or styles to draw attention to particular items.

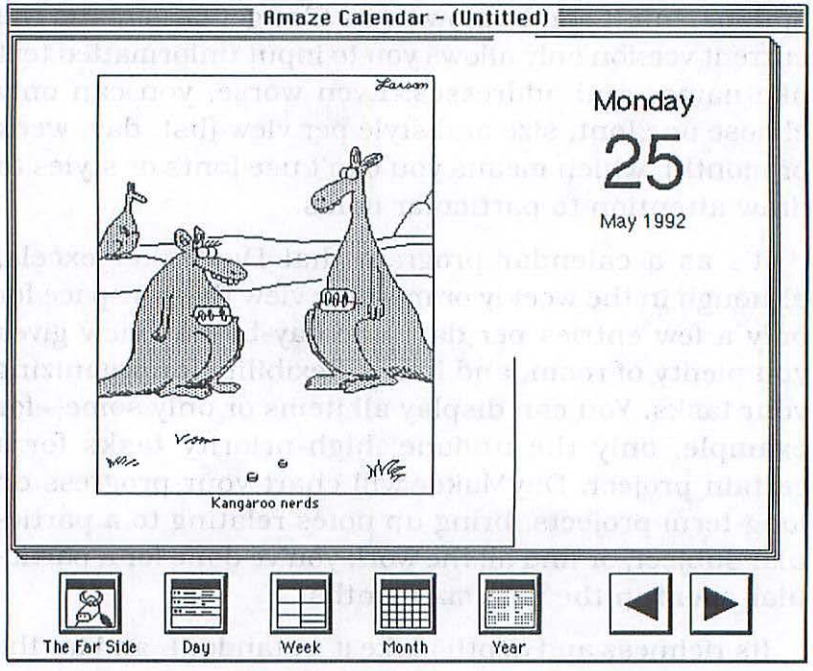
It's as a calendar program that DayMaker excels, although in the weekly or monthly view there's space for only a few entries per day. The day-by-day view gives you plenty of room, and lots of flexibility for organizing your tasks. You can display all items or only some—for example, only the undone, high-priority tasks for a certain project. DayMaker will chart your progress on long-term projects, bring up notes relating to a particular subject, or find all the work you've done for a particular client in the past six months.

Its richness and depth make it a standout, and for the beginner, it's a fine calendar, alarm and to-do program. After you're more experienced, you can use it as a flexible way of managing and retrieving an astounding amount of information. But its address and phone-dialing capabilities need some work—and after a year, the promised upgrade is still just promised.

✎ *The Far Side Computer Calendar* (EF)

Not only does this $70 calendar program from Amaze have a sense of humor, but it's easy to use, with lots of icons for moving from time to time or function to function. You can view or print your calendar in day, week, month or year format, and you can add recurring events and set an alarm as a reminder (but it sounds only if the program is running).

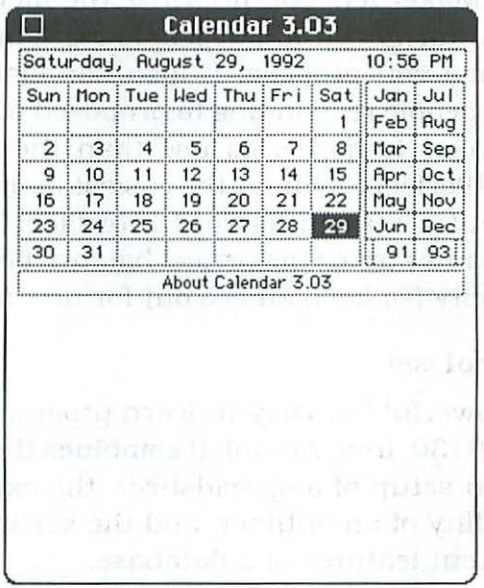
The only significant drawback is that Gary Larson's great cartoons take up a lot of room on disk—1.4MB for the whole year's cartoons (although you don't have to load them all at once) plus 370K for the calendar program. The calendar starts on the day you load it and runs for a whole year; a year's refills cost $25.



✎ *Calendar DA* (Chris Allen)

This is an elegant little shareware desk accessory for planning and scheduling. When you first open it, it

displays the current month, with the current date selected. There's a text area at the bottom of the window for listing today's events (it will be empty, of course, since the program isn't psychic). Entering text into this area outlines the date, so you know there's something there. Clicking on other days, months or years changes the calendar to show the appropriate day.



Calendar DA doesn't print calendars, nor is it an alarm clock, but I've been using it continuously (in one version or another) for about five years now. It was written by David Oster, who asks for a $15 shareware fee. It's included on *The Macintosh Bible Software Disks*.

group schedulers *(Michael Miley)*

If you work with others on a Macintosh network, a group scheduler can help you set up meeting times. Everybody's schedule is stored in a common database, and the scheduler tells you whether they'll be free at the time you want to meet (but it won't let you see other people's schedules, unless you know their passwords).

WordPerfect Calendar is a group scheduler that's built into WordPerfect Office (an office automation package that lists for $150) and Schedule+ is bundled with Microsoft Mail ($125). If you want more features, consider On Technology's Meeting Maker ($500–$900, depending on the number of users), which doesn't require the presence of a separate e-mail program.

Meeting Maker lets you prioritize the members of the group, and warns you if key people can't make a meeting at a time you propose. It also has elaborate reply options for people responding to proposed meetings. But Meeting Maker is harder to use than the other two. I found WordPerfect Calendar the easiest to use, with good features and a straightforward interface, but none of these programs strikes the perfect balance between power and simplicity (so keep an eye out for new products).

In Control *(SM)*

This is a powerful but easy-to-learn program for making to-do lists ($130, from Attain). It combines the flexible row and column setup of a spreadsheet, the expandability/contractability of an outliner, and the sorting and data-entry shortcut features of a database.

You can drag topics around to change their order or restructure your outline, and you can add as many columns as you need (to attach deadlines, priority levels, people to contact, comments, etc.). Once a column is added, you can sort your list on it. For example, I have a list organized by projects, and one of the columns indicates if the task is a phone call, an errand or something I have to do on the Mac. It's easy for me to bring all the phone calls to the top of the list, or print out a list of errands.

I'm a pen-and-paper list maker myself, but In Control is so well designed (by the creators of FileMaker, who are known for combining power with ease of use) that it's won me over. Still, I have some complaints: commands for text

styles are buried in a submenu; ⇧⌘B, the standard Mac command for boldfacing, has actually been assigned to another function; and you can't assign styles to different levels of the list (except after the fact).

Project managers

Great Gantt! *(KF)*

Varcon's Great Gantt! ($200) is an easy-to-use application that produces great Gantt charts. And *what*, you ask, is a Gantt chart? Well, it uses bars to chart tasks on a timeline. The sample below illustrates the creation of the world in seven days (which was Arthur's idea, as you might have guessed).

Great Gantt! lets you see at a glance the planned and actual start and end dates of each task in a project, which tasks are ahead of or behind schedule, and how near each task is to completion. Great Gantt! also lets you customize your Gantt charts, making them as plain or fancy as you like. You can also create style sheets by saving customized formats.

very good feature

Great Gantt! imports files from MacProject—which is good, because MacProject II only offers two Gantt chart formats, and they're both bare-bones.

Creation of the World

Name	Description	Days 1 2 3 4 5 6 7 8	Planned Start	Planned End
create heavens and earth	formless, dark		01	01
create light			01	01
name light and darkness	day and night		01	01
create firmament	heavens		02	02
gather waters together			03	03
dry lands appear			03	03
name waters and land	seas and earth		03	03
create plant-life			03	03
create great light	sun		04	04
create lesser light	moon		04	04
create lights in heavens	stars		04	04
create animals			05	05
create humans			06	06
rest			07	07

There are a couple of drawbacks to Great Gantt!. For one thing, while you can change the font and style of column headings, you can't change the point size. For another, the way Great Gantt! moves text blocks is clumsy. If you create a text block and want to move it immediately, you have to click on the pointer tool, click outside the text block and then move the text block. It seems like a small thing, but it takes some getting used to. *[According to Varcon, version 2, which will probably be available by the time you read this, addresses some of these concerns.—ND]*

Great Gantt! comes with a good manual that's written by humans for humans, and good technical support. All in all, it's a good application that does what it says it does.

MacProject *(ND)*

MacProject is a powerful project-management tool that just came out with a new version as we went to press. So we'll review it in one of the updates.

Financial and accounting programs

Quicken *(SB)*

This $70 checkbook program from Intuit combines a very low price with extreme ease of use. You enter transaction data quickly and easily on a screen that resembles a check. The program keeps all your accounts—checking, savings, credit cards and cash—in a single file.

Version 3 has various built-in reports that track your cash flow, net worth, itemized expenses, progress toward savings goals, etc. Business reports include profit and loss, balance sheet, payroll, accounts receivable and accounts payable. (You can also customize reports, but you'll probably have to refer to the manual because the method is

a bit obscure.) The program can print checks on paper you buy from Intuit, or you can link with the CheckFree service (described in the *e-banking* entry of Chapter 17) to pay electronically via your modem.

Importing and exporting data is for experts only. That goes double for Quicken's much-advertised link with MacInTax, which is so tedious that you might as well input figures onto your tax forms manually (there's some hope for a better conversion between the two programs by the time you read this, though).

I wish the Mac version of Quicken had a stock portfolio manager, as the Windows version does. I also wish it would keep a more rigorous set of books. Contrary to accepted accounting practices, you can modify *any* transaction at *any* time, and it's possible to close the books out of balance.

In fact, when your account doesn't reconcile, the software offers to *make an entry of the difference* so it will reconcile next time! While this may be forgivable when keeping books at home, I shudder to think of any small business owner doing the same thing. *[Too bad the federal government doesn't share your qualms.—AN]* A business needn't be very large before it makes sense to spend a little more and get a real business accounting package (some are discussed below).

MacMoney *(SB)*

Until version 3 of Quicken came out, Survivor Software's MacMoney ($120 for version 3.53) had the fastest data entry and most elaborate reports of any Mac personal finance package. The reports in Quicken now are about as good, it has slightly faster data entry and it sells for about half the price. However, people already using MacMoney should probably not switch products, because the difference isn't significant (and the next version of MacMoney may surpass Quicken, anyway).

MacMoney is also a better choice than Quicken for very small business users, because it keeps more formal books, and its $100 InvoiceIt add-on lets you write and track invoices.

✒ *Managing Your Money* (SB)

Both Quicken and MacMoney do a better job of managing your checkbook than Managing Your Money ($80 for version 4, from Meca Software). But MYM is the only one of these three programs that can manage stock portfolios, and can help plan and track your life insurance needs, retirement savings, kids' college funds and taxes. (Starting with version 5, which may be available by the time you read this, it also lets you keep all the details private with password protection.)

Unfortunately, you have to spend a lot of time learning the program and entering your financial statistics. Most users probably never get most modules in operation and are haunted by their vows to enter more data "next weekend." Once you get MYM up and running, though, all the parts work together well. For instance, if you sell some stock, entering the sale in your portfolio also updates the balance of your checking account, your net worth and your tax files.

The clearly written manual and extensive on-screen Help make the program fairly easy to use, considering the many modules. The CheckFree electronic bill-paying service is a built-in option.

✒ *MacInTax* (SB)

An overwhelming favorite since its introduction in 1985, MacInTax ($100 from ChipSoft) does an excellent job of helping you fill out your tax forms. On screen, you see an exact replica of the paper forms, but there's an important difference: the forms do calculations for you, and they're linked so that a figure you input (or which is calculated) on one form automatically appears where you need it on other forms (and changes if the first figure changes).

MacInTax forms print out so well that the IRS accepts them even off ImageWriters. If you're expecting a refund, electronic filing is available, so you'll get your check from the IRS in a few weeks instead of a few months.

MacInTax includes pretty much all the IRS forms anyone is likely to need, along with supporting statements and worksheets; state forms are available for about fifteen states, at $70 each. While MacInTax is easy to use, filling out one's tax forms isn't always so easy, so MacInTax provides good on-line help; in fact, it's the most elaborate customer support I've ever seen. *[MacInTax is so easy to use that I never looked at its documentation until I had to write a review. And I never used its telephone support until I was audited.—SA]*

MacInTax typically releases a preliminary edition in early December. While these forms can be filed, certain less-common ones usually aren't available until closer to April 15, and there may also be some minor changes in the preliminary forms. (This isn't really due to poor planning by the developers; the IRS often doesn't finalize the forms until it's too late for the programmers to finish everything by New Year's Day.) All registered users receive the late release free, generally by mid-January.

All did not go according to plan in early 1992, though. In 1991, ChipSoft acquired MacInTax from its original publisher. The transition was a little bumpy: the 1991 version shipped late and was the most ragged in years. The conversion utility that's supposed to pick up information from the previous year's forms barely functioned, and some people had trouble with installation. I expect ChipSoft to be on top of things this year. *[If they're not, let us know. And also inform consumer columnist Deborah Branscum at* Macworld.*—ND]*

Remember that not everyone needs tax software. If your tax situation is very simple, it may take longer to install MacInTax than to do your returns by hand. If you have a fair number of entries on Schedules A, C, D or E, then you're a good candidate for MacInTax.

Heizer templates *(SB)*

Heizer Software distributes over 240 federal tax forms available as Excel and Works templates. Programmed by Steve Willett, they come on dozens of disks; you just buy the ones you need. (A 1040 runs $40.) About a dozen state forms are available as well. These are classics; they've been reliable for years, and about half the people who buy them are professional preparers.

(Other software from Heizer helps with everything from managing your stock portfolio to calculating your biorhythm. There are databases of all the members of Congress (with addresses), all US colleges and universities, and all *National Geographic* articles in the last thirty years. Most templates are in the $5 to $100 range.)

small business accounting software *(SB)*

Keeping a good set of books can sometimes make the difference between survival and failure for a small business. Too often, the boss thinks the problem is solved by buying an accounting package, forgetting that the staff is already working full time on other things. How are they going to learn to use the software, set it up and begin using it, while still being responsible for all their other tasks? And what's the use of entering all that data if no one uses the reports from the accounting package to make informed management decisions?

The software listed below isn't a complete list of Mac accounting packages—just my favorites. You may find an older program that fits your needs better, or you may come across one that has come out since this book went to press—in which case, get a demo disk and try it out. And be sure to buy your accounting software somewhere that offers at least a 30-day money-back guarantee, so you can really try it out before committing the time necessary for training and setup.

Peachtree Accounting for Macintosh (SB)

Version 1.3 of Peachtree Accounting for Macintosh is a solid, small-business accounting package with four modules (accounts receivable, accounts payable, general ledger and payroll). It comes with four megs of HyperCard tutorials, online help, a large printed guide and many handy checklists that help with initial set up and routines like closing.

Each accounting period can be open, closed or locked. A locked period can be viewed with all transaction detail, but it can't be edited. This prevents accidental changes to the wrong period. Two years of data can be maintained in a file, so you can compare this year with last year. There is no inventory module, but you can keep some statistics for each item. The payroll module is especially robust.

Peachtree Accounting has a very good custom report editor, but you can't change fonts and style. To export the reports to your word processor for tarting up (as the Brits say), you need the $50 import/export utility. Still, at just $100, Peachtree Accounting is a very good value—and $200 cheaper than the earlier version (which was called atOnce before Peachtree bought it).

M.Y.O.B. (SB)

Teleware's M.Y.O.B. is a good choice for people who don't know much about keeping books and don't particularly want to learn. Even the manual offers three ways to set up for people with different expectations: those who are starting a new business and want to do things right, those who are migrating from some other way of doing books (another program or books by hand) and those who want a quick-and-dirty start (rather like an electronic checkbook) with the option to later expand their use of the program.

All in all, it's the easiest small-business accounting package to set up and use. For $250, you get accounts receivable, accounts payable, general ledger and inventory. (There's also an integrated to-do list, a calendar for reminders and a phone log that can dial for you.) M.Y.O.B.

has a highly innovative interface; the main screen is a navigation screen with a flow chart of the modules, so you can click on plain English choices—like *Write Checks*—to go where you want.

Version 3 has added many enhancements, including import/export, backorder and improved invoices and purchase orders. However, M.Y.O.B. lets you edit any transaction throughout the fiscal year, something sure to raise some accountants' eyebrows.

❦ *MultiLedger* (SB)

CheckMark's MultiLedger is the small-business accounting package accountants prefer. For them, it's straightforward and elemental, but if you aren't an accountant, it may seem somewhat opaque, and it has the thinnest manual of the programs discussed here. MultiLedger is also rather conservative—each month must be closed.

For $400, you get accounts receivable, accounts payable, general ledger and inventory. (A multiuser version of the program is also available for $700.) CheckMark also publishes the highly respected Payroll ($300), which can be used by itself or as a module of MultiLedger.

MultiLedger reports can't be customized, but data can be exported as ASCII text for dressing up or analysis in other programs. Screens have a rather plain-Jane look, but pop-up menus speed data entry. This program is a good choice for those confident about keeping books.

❦ *Accountant Inc.* (SB)

Accountant Inc. 3.0 ($600 from Softsync/BLOC) attempts to place itself between the standard off-the-shelf accounting package and the much more expensive modular ones discussed in the next entry. It has more modules than the competition—accounts receivable, accounts payable, general ledger, inventory and payroll—and some eye-catching features; the $1000 multiuser version includes its own software server, so all you need to set

up a network running Accountant Inc. is some phone wire and a few PhoneNet connectors.

Accountant Inc. can send and receive Apple Events, which means—if you take the time and trouble to program the links—that you can have data in a database interact with your accounting records. Unfortunately, Accountant Inc.'s reports don't show a similar level of flexibility. While over 100 canned reports are included, the program can't make custom reports; you have to export the data to another application for that.

high-end accounting programs *(SB)*

Many small-business managers decide they don't have the time or expertise to thoroughly research which accounting package would be best for them, so they ask for recommendations from dealers or consultants (saying they want "the best"). Or they ask their accountant (who probably doesn't use a Mac). In either case, the answer is likely to come back "Great Plains" (the best-selling high-end package). But few of those advisors realize that the first year's bill for consulting, training, software and tech support for a Great Plains installation may run over $10,000.

Now that I've got your attention, here are some other considerations: A high-end accounting system makes sense only for those with industrial-strength needs—a networked environment, thousands of transactions a month, two or more full-time employees working on the books and so on. Don't try to install a high-end system without a qualified installer whose references you've checked out *[thoroughly—AN]*. Plan on four months or more to get the system up and running *[if you're lucky—AN]*.

Great Plains has more modules than any other Mac accounting system (they cost $500 to $1000 each), the best marketing department, the best training and the best tech support. What it doesn't have is a Mac interface. They've sold a Mac version of their PC product for years, but it still looks and acts like a MS-DOS program. If you love your Mac, you'll hate using Great Plains.

As an alternative, consider SBT Database Accounting Library. For $300 single user or $700 multiuser, you get the source code, which is written in FoxBase, when you buy any modules. This means you—or more likely a qualified installer—can modify the package to your particular needs. Eleven modules are available, but only the core modules (general ledger, accounts receivable, accounts payable) have an acceptable Mac-like interface. The less-common modules still look like the DOS programs they all began life as. Still, it's less expensive than Great Plains, and customizable as well. *[We've used SBT for years and haven't liked it at all, although some of that may be due to the incompetence of the person who installed it and modified it for us.—AN]*

Peachtree's Insight series (formerly from Layered) seems to be in decline. The price has dropped to $400 per module, and you may be able to install them yourself for further savings. Only the general ledger, accounts receivable and accounts payable modules are worth considering; the others don't work well enough. No multiuser version is available.

You may want to keep your eyes open for HoneyBee Accounting from Canada. It's an impressive package written in 4th Dimension that's trying to make its way into the US market.

[I'm told there's a saying in business accounting circles that no one is ever happy with their accounting package. Although I didn't appreciate hearing that from the people who had just customized and installed ours (as a response to the blizzard of problems that ensued), it certainly was my experience.

In the hope of finding a decent system for ourselves, we did an enormous amount of research, and eventually gave up on finding a package that would process our mail orders quickly and give us the accounting we need. Instead, we set up a customized database to process orders and exported data from that into a separate accounting package. But that didn't work well either, and we're still—after

five years—trying to find something that meets our needs. If you need to find something now, all I can say is, do plenty of research, and don't be surprised to find that your accounting package is dictating how you run your business.—AN]

point-of-sale software *(SB)*

ShopKeeper Plus can connect a Mac to a cash drawer and a bar code reader to give you a smart cash register that keeps track of inventory. It can print receipts on any Mac printer, and even prints bar code labels for merchandise. It will export data to MacMoney, Peachtree Accounting for Macintosh, MultiLedger or Simply Accounting, and $15 templates are available for My DataBase ($60) that let you create custom reports and mailing lists. ShopKeeper Plus' hefty manuals include information on how to make custom forms, or you can pay the publisher $15 an hour to do it for you.

ShopKeeper Plus is System 7 compatible (you can get a free demo disk of it) and they've also kept Version 3 available for people who want to run the program on a 1MB machine. Both versions cost $500 (or $1000 for a multi-user version). Bill It-4 ($160) is a subset of ShopKeeper Plus for people running small service businesses.

ShopKeeper isn't very flexible, but if you're trying to run a small retail business on a shoestring, this is a lot of software for little money. You may use it for years before outgrowing it. If you need more (and can afford it), Ensign Systems' POS-IM is a much more elegant and slightly more powerful program that's used by Apple's Company Store. Several specialized versions are available starting at $800.

SuperMOM *(AN)*

National Tele-Press' SuperMOM (for *mail order manager)* is an order-entry program that's easy-to-learn, even for novice users. It manages everything from accounts receivable to inventory, sales tax and telemarketing. We used an earlier version of the program (called simply *MOM)* at Goldstein & Blair for over a year and National Tele-

Press' support was a delight. There was always a technically knowledgeable person available to return calls, answer user questions and patiently walk people through problems.

SuperMOM ($700, $300 for the home-business version) lets you edit or reverse any transaction you make, and you never have to key information in twice—the relevant fields are interconnected and the information is automatically entered in all of them. If you don't want to take the time and trouble to customize a database like FileMaker for your own use, and you want all the connections between files thought through and set up for you ahead of time, SuperMOM is definitely worth considering.

Wills, forms and other documents

WillMaker (AN)

Nolo Press, publisher of scores of extremely useful self-help law books and crusader against the ruling shysterocracy, has a terrific program that helps you write your will. (Dying without a will is really a mistake. The legal and judicial buzzards will feed off your financial corpse, greatly reducing what your friends and family get. After all, do you really want your Mac sold to pay the predatory fee of some troll at the courthouse?)

very good feature

WillMaker comes with an entire book that gives you background on the various choices making a will confronts you with, but you can just let yourself be walked through the program and only consult the book when you want (or not at all). When you're done, WillMaker prints out a will (on virtually any Mac printer) that's a legal document in any state except Louisiana (whose laws are based on the Napoleonic Code rather than English common law) and the District of Columbia.

WillMaker costs $60, which is a small fraction of what a lawyer will charge to draw one up, or of what the probate court will extract as tribute if you're foolish enough to die intestate (without a will). Making a will is an easy thing to put off, but WillMaker makes it easy and almost fun, so don't put it off too long.

Nolo's Living Trust *(Bill Davies)*

Nolo's Living Trust is the best estate-planning software available for the Mac. It helps you create a living trust, which lets you will property to people without it having to go through probate. The program has enough flexibility to accommodate life's complexities (for example, different assets can have different custodians and beneficiaries). My only gripe is that you can't preview a trust document until you've completed all the steps of the program, though it's fairly easy to edit a completed version before you print and sign it.

Living Trust comes with online help and a comprehensive manual (it pays to study it, or you might make a mistake that could invalidate your efforts). Conveying property properly can be a bit tricky, so you probably should have an attorney review the living trust you produce with this software. But even if you do, Living Trust, at just $80, should still save you a lot of money.

[A lawyer I talked to said the clients he's had who have used this program used wrong forms or mixed things up some way so that they didn't end up saving any money on lawyer's fees. But using Living Trust will at minimum make you better informed and more in control of the process, and you might save some money because your information is better organized.—ND]

Personal RecordKeeper *(AN)*

Here's another useful product from Nolo. Formerly called *For the Record*, it helps you organize all your personal, financial and legal records so you can find them when

you need them. Personal RecordKeeper ($50) lets you protect your records with a password, and print them out, in whole or in part. The 270-page manual gives you legal background and practical tips on record-keeping and personal planning.

Like making a will, organizing your personal records isn't the sort of thing you plan a weekend around. But, also like making a will, it's something you shouldn't put off too long—and that you'll feel great about getting out of the way.

Informed Designer and Informed Manager *(SB)*

You can design good-looking forms with a drawing or page layout program, but forms software makes the process easier, and lets you create forms that compute data as you fill them out on-screen. Two programs work so well that they've driven out the competition.

Informed Designer ($300 from Shana) has specialized drawing tools for designing printed forms; they have an accuracy of over 1100 dpi and can draw fine hairline rules. Once the form is designed, you add the intelligence by drawing invisible rectangles over the fields and assigning special properties, like pop-up lists for multiple-choice fill-in, alert boxes (for instance, to warn that a field must be filled in to complete a form), calculations (such as adding sales tax) and automatic fill-in from a lookup list (so you enter a part number and the part description and price appear automatically).

People who fill out the forms use Informed Manager (also $300 from Shana). It can display all the records from a file in spreadsheet style, with each row a record, each column a field. Column order can be changed and each column can be sorted, totaled, counted or averaged. You can look for subsets of the records (like all orders worth more than $1000) and combine several files of identical forms. Both programs let you attach notes to individual forms, just as you'd stick a Post-It note to a printed copy.

Chapter 13

Graphics

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Graphics overview

For reviews of utilities (small programs) that handle graphics, see Chapter 7.

kinds of graphics programs *(AN/SA/SM/ND)*

Graphics programs for the Mac fall into five basic categories:

- *Paint* programs create bit-mapped images—that is, ones that are made up of dots. The dot is their basic unit, so if you want to move a bit-mapped image, you have to surround all the dots that make it up and select them as a group.
- *Draw* (or *drafting*) programs treat each item you draw as a discrete object. All you have to do to select a draw object is click on it. (On the down side, you can't fine-tune an object, removing a dot here and adding one there.) High-end draw programs go by the name of CAD *(computer-aided design)* and are sometimes specific to a particular profession.
- PostScript-based *illustration* programs create images that scale perfectly to all sizes.
- *3D* graphics programs let you simulate a three-dimensional image on your two-dimensional computer screen.
- *Combination* programs let you work with both bit-mapped and object-oriented images, placing them on different levels (which work like transparent overlays, so you can see everything that's on each level). Canvas provides paint, draw *and* PostScript tools.

In general, bit-mapped images are better suited for artistic tasks and object-oriented graphics for business applications like drafting and diagramming. PostScript images are hard-edged like object-oriented graphics but are capable of much greater sophistication and subtlety (they still don't have that bit-mapped look, though). This isn't an either/or proposition. If you do a fair amount of

graphics work on the Mac, you'll want to have at least a paint/draw program (or separate paint and draw programs) and probably also a PostScript one.

Any of these types of programs may or may not handle color. If they do, they're often used just for that, but some programs—Illustrator and FreeHand, for example—are commonly used for both color and monochrome work. The most basic color programs are 8-bit, which produce 256 colors. 24-bit color programs give you more than sixteen million colors, but working with 24-bit images requires faster hardware and more memory.

fine art programs *(Jerry Clement)*

These high-end paint programs mimic real-world noncomputer art like charcoal drawings, watercolors, calligraphy done with brushes, paintings with thick brush strokes, etc. They work with a pressure-sensitive drawing tablet instead of a mouse; how hard you press a stylus on the tablet determines the kind of line you get. (A couple of these tablets are reviewed at the end of the chapter.)

In the best programs—like Painter, Oasis and Studio/32, reviewed below—all (or nearly all) the brushes and pens are pressure-sensitive, but watch out for programs in which, despite their grandiose claims, only one or two tools are pressure-sensitive.

CAD *(Steve Lukrofka/ND/AN)*

CAD software is primarily used by architects, engineers and other designers to produce blueprints and plans. Even simple CAD programs keep track of each object's dimensions and other characteristics.

The most powerful CAD programs combine two-dimensional drafting, three-dimensional modeling and powerful databases into integrated tools that can handle all stages of design. For example, they retain so much detail that they can automatically generate a shopping list of

the materials needed to construct the project as drawn (called a *bill of materials).* But they cost a lot ($3000–$5000) and take quite a bit of time to learn.

everything including the kitchen sink *(AN)*

To give you a feeling for what CAD can do, here's a brief description of ArchiCAD (from Graphisoft), a CAD program designed for architects.

Whenever our office has moved, I've spent many hours drafting the new premises in MacDraw, planning where the furniture would go and so on. This kind of map, drawn as if from directly above, is called a *plan* (as opposed to an *elevation,* which shows how something will look from the side; a *section,* which shows how it will look if sliced through vertically; or a *perspective view,* which shows how it will look in three dimensions, from a given point of view).

ArchiCAD also begins with a plan, but instead of just drawing a line, you specify what the wall will actually be (or is)—say, reinforced cement block 8" thick on the outside, then 6" of fiberglass insulation, a frame of 2x4's and sheetrock on the inside. Then, whenever you draw a line, that's what you get—that exact wall, in exactly the correct thickness, with each layer of it coded with the standard architectural patterns for the material used.

To put windows in the wall, you choose what you want from a library of dozens of basic types, then customize the dimensions. Let's say you pick a double-hung 30° bay window 6'7" high by 7'9⅝" wide, with a frame 2½" wide and 4" thick, with two rows of four panes in the center section, and two rows of two panes in the side sections. You just click anywhere on the wall with the mouse, and ArchiCAD inserts exactly that window.

There are also extensive libraries of doors (with and without sidelights, with and without transoms, as well as bifold, sliding glass and garage), toilets, washstands,

showers, tubs, kitchen sinks, cabinets, stoves, refrigerators, tables, chairs, etc. etc. You just choose what you want and click to place it.

But you ain't seen nothing yet. Once you've got things laid out in plan, ArchiCAD will show you how everything looks in elevation, in section or in perspective, with contours and shading, from any point inside or outside the building, with the light coming from wherever you want!

Hmmm, that butcher-block table doesn't look quite right under that bull's-eye window, viewed from the couch over in this corner. Shall I change the window, use another kind of table or move the couch? By the time you're done playing around with all the possibilities, you have an intimate knowledge of how the space will actually be to live in.

Specialized CAD programs aren't cheap (ArchiCAD, for example, costs $4500). But they're designed for professionals, not individuals, and they quickly recoup their price with the time the program saves them.

3D graphics *(DH/AN)*

Anyone who uses models to help visualize things can benefit from three-dimensional graphics programs. Architects can simulate walkthroughs of planned buildings and substitute construction materials (wood for stucco, say). Mechanical engineers can examine parts that would be inaccessible in an actual machine, and industrial designers can do comprehensive drawings of proposed products and packaging. 3D graphics can even improve sales presentations, or teach children about an eclipse.

Although they're represented on a two-dimensional computer screen, 3D graphics behave like three-dimensional objects in the real world. If you rotate them, you see the back of them, and if you move them, you see what's behind them. You don't have to draw in things like perspective and shadows, because the computer will calculate those for you.

3D objects can be displayed in a variety of ways. *Wireframe* is the most basic (and fastest); it only shows lines connecting the vertices of an object. Many programs include the option of hidden-line removal (taking out the lines in back, that you couldn't see if the object were solid). But 3D graphics can also be so finely detailed that they're called *photorealistic*. And they can be animated as well.

You can add colors, textures, even pictures to the surfaces of the objects. Most programs also let you light them from any angle and let you specify the color, intensity and type (point, spot or ambient) of the lights. (These variables can have a major effect—a stand of trees looks entirely different when illuminated by the setting sun than by the headlights of a passing car.)

All this takes some horsepower. Typical 3D graphics files range in size from several hundred K to over a hundred megs. Even on a fast machine, a single image may take 36 hours or more to render! So to do 3D graphics, you need *at least* a 68020 processor, eight megs of RAM, a 100MB hard disk and a 13" grayscale monitor; you'll *want* a 68030 or 68040 processor, more RAM, a larger hard disk and a two-page color display.

graphics formats *(SA/AN/Steve Lukrofka/ND/SM/DH)*

mostly for beginners

Each kind of Mac graphics program saves its files in its own, *native* format, which may or may not coincide with one of the basic file formats used to transfer images from one program to another (or even between Macs and other kinds of computers). Some programs give you a choice of several different formats to save files in, and some also recognize many different formats.

- *Paint* files are 72-dpi, black-and-white-only, bit-mapped images; in addition, they're limited to an 8" x 10" page.
- Like paint files, *TIFF* files *(tagged image file format)* are bit-mapped, but they can be any size and have any resolution (number of dots per inch)—although 300 dpi

is common. TIFF is generally used for images created by scanners. (Although it was intended to provide a high-resolution bit-mapped standard, everybody wanted to improve it—and did, in different ways—so the TIFF standard isn't exactly standard anymore. Some TIFF images are black-and-white only, most support gray-scale information and a few do color—it all depends on the software that creates the image.)

- *PICT* files (from *pict*ure) are used to transfer the object-oriented graphics created by draw programs. PICT files use QuickDraw, which is also used to display things on the Mac's screen. The original PICT only allowed for eight colors, but the current standard—PICT2, which is now used almost universally—allows for full 32-bit color, which is the most the Mac can produce.
- *EPS* files *(encapsulated PostScript)* are combinations of the PostScript code that tells the printer how to print the image and a PICT image that tells the screen how to display it. (You can just use the PostScript code—place it in PageMaker, for example—but you won't be able to see it on the screen, because the screen doesn't know how to display PostScript instructions. You'll get just a gray box instead.)
- *DXF (drawing exchange format)* is the most common CAD format on personal computers, but some Mac programs can also handle *IGES (initial graphics exchange specification),* which is primarily used on minicomputers or CAD workstations. *Plotters* (which use pens to draw blueprints, plans and diagrams) use a format that's become a de facto translation format—*HP-GL (Hewlett-Packard graphics language).*
- There's no industry-standard 3D format, but the closest so far is *RIB (RenderMan interface bytestream).* It's based on RenderMan, a scene-description language that's analogous to PostScript.
- Graphics files can be huge, and several *compressed formats* exist to reduce the size of them. Common ones are *RIFF (resource interchange file format), JPEG (Joint Photographic Experts Group)* and *GIF (graphics interchange format),* which was created by CompuServe

to reduce the time necessary to transfer bit-mapped files via modem.

Graphics programs

MacPaint and Studio/1 *(DP/SA/AN)*

MacPaint 1, which came bundled (included free) with the original 128K Mac, set the standards for Mac graphics. Version 2 ($125 list, from Claris) has some very elegant features, like tear-off menus and the ability to only erase the artwork you've added since you last took a "snapshot" of the document, but it falls far short of what other paint programs are doing these days—for example, it can't rotate in increments smaller than 90°, and it's limited to 72 dpi and an 8" x 10" page.

Electronic Arts' Studio/1 beats MacPaint hands down. It isn't limited to an 8" x 10" page, it lets you edit at higher resolutions than 72-dpi, and its keyboard commands—B for the Brush tool, E for the Eraser, etc.—make painting more efficient. You can also zoom in and out by hitting the number keys.

As a bonus, Studio/1 comes with some terrific tools for animating paintings. Tell Studio/1 how many frames to flip at what speed, and you're in business; you can even draw the first and last frames, and it will automatically fill in the middle. Studio/1 is a lot of fun, and it lists for only $80.

MacDraw *(DP/SA)*

MacDraw was the first object-oriented graphics program. It's dependable and allows for a lot of precision in the drawing and placement of geometric objects. MacDraw II ($200, from Claris) has text handling capabilities that make it suitable for basic (one- or two-page) layout jobs.

The Pro version ($400) has a number of new color features, including spectacular *color gradients* (which fill

an object with color that smoothly shifts from one shade to another) and even better text handling.

MacDraft *(CS/AN)*

MacDraft 2 ($400 from Innovative Data Design) brings precision drawing capabilities to people who only need them occasionally (and who are therefore apt to forget the details of how the program works between times). Its drawing palette has a simple assortment of icons; to see more sophisticated tools, you hold down the mouse button on icons in the palette.

very good feature

This makes the program easy to learn and prevents neophytes from being confused, yet lets IDD add more advanced features like splines and Bézier curves without complicating the intelligible, clean interface. IDD also offers add-on libraries of symbols for engineers and architects (about $100 each).

Although MacDraft can be used for CAD-like tasks, it omits many of the features IDD put into Dreams, its higher-end program. For example, MacDraft's dimensioning is impressively simple, but it doesn't compare to the flexibility of dimensioning in Dreams. Similarly, MacDraft's object-manipulation facilities (like add, subtract and glue) aren't as complete as a CAD program's.

MacDraft isn't a universal drafting solution, but it's effective for a wide range of beginning to advanced drawing projects, particularly for the casual user.

Canvas 3 *(DP)*

very good feature

Because Canvas ($400 from Deneba) creates paint, draw and PostScript graphics with equal ease, it's sometimes called the Swiss Army Knife of graphics programs. It even has some fancy architectural features, like dimension tools that automatically measure and label lines and angles. Together, these tools let you create some dazzling effects, from stunning, full-color rainbows to text you can twist like taffy.

The spelling checker and text rulers make Canvas a good choice for short page-layout jobs, and its multiple transparent drawing layers make it ideal for complex technical diagrams. But all these features slow down all but the faster Macs. And learning Canvas takes time—many of its tools are buried in a nonstandard hierarchical tool palette (fortunately you can omit the less useful ones). Canvas is powerful, but it's neither speedy nor simple.

SuperPaint 3 *(DP/SA/SM/AN)*

SuperPaint ($200 from Silicon Beach, which is now a division of Aldus) is a combination paint/draw program. You see both layers on the screen and in printouts, but you only work in one layer at a time (you can also hide either layer if you want to). Version 3 makes it easy to apply gradients and *texture fills* (simulated texture on an object's surface). It has extendable tool palettes (you can add tools that are written by third parties), Bézier curves and autotrace, and many special effects can be added to text in the draw layer.

However, SuperPaint 3 is by no means state-of-the-art. For one thing, it's slow. For another, there are only three magnification levels, and when you use one, a wide slice of your screen is wasted with an actual-size view (most programs let you choose how to view your work when you zoom in). Worse, when you zoom into the draw layer, the view is just as jagged as if it were on the paint layer. When you rotate an object, a gray box covers it, so you can't see what's happening. And both SuperPaint 3 and 2 have significant problems printing certain graphics, especially exported PICT files.

FreeHand and Illustrator *(SA/DP/SM)*

Aldus FreeHand and Adobe Illustrator (both $600) are the two premier PostScript illustration programs. Both give you files of your artwork that will print at the highest resolution available on a PostScript printer or imagesetter. If

you're deciding which one to buy—good luck; most Mac graphic designers have both.

Both have *autotracing*, which does an approximate conversion of bit-mapped or PICT images into PostScript, and both let you do fantastic things with text, like binding it to a curved path (although to edit text, FreeHand makes you go into a dialog box). People seem to prefer FreeHand's method of dealing with colors and fills. And, unlike Illustrator, it accepts TIFF files.

Illustrator's advantages are its uncluttered design and fewer tools to do the same jobs. For example, FreeHand has separate tools for making curves (with two corner points, with a single corner point and with no corner points), while Illustrator has a single tool capable of making curves with any kind of control points. Illustrator is also better for fine detail work and technical drawing.

Many designers don't like Illustrator's separate working and preview modes. (FreeHand lets you work in the Preview mode, so you can adjust things in the view that's most representative of the final product.) Some designers create graphics in Illustrator and then import them to FreeHand to do the fills. FreeHand also works better for complicated pieces of artwork, because you can put items in different layers and then hide every layer but the one you're working on.

Streamline *(SA/SM)*

Streamline ($200 from Adobe) is a utility that traces bit-mapped graphics and converts them into PostScript; it does a better job of that than Illustrator's or FreeHand's built-in utilities. You usually still need to import the result into one of those programs for fine-tuning, but Streamline is an incredible time-saver.

Photoshop *(DP)*

Adobe's Photoshop is an extraordinary, professional-level color graphics program. It costs $900, and that's not the

end of the expense—to make Photoshop realize its full potential, you need a 24-bit color monitor, a scanner, at least four megs of memory and a big hard disk.

Technically speaking, Photoshop is a paint program (because its files are bit maps) but it's really used for image-processing or photo retouching. It lets you open files in almost any kind of graphics format and gives you *anti-aliased* (jaggie-removing) brushes and pressure-sensitive tools to change or enhance the image. Photoshop's filters are justifiably famous—with them you can create dazzling special effects, even to the point of editing a person out of a photograph.

Photoshop also is one of the most powerful color prepress programs available, generating *four-color separations* (a step in creating plates for the press) with extreme accuracy.

Painter *(Jerry Clement)*

Fractal Designs' Painter ($350 list) has no equal when it comes to simulating real-world fine arts. You can choose paper textures and mix media to get any painting or sketching effect. Tools imitate everything from Japanese-style or fine sable brushes to crayons and felt-tip pens.

Some brushes paint in the style of Van Gogh (multi-colored strokes) or Seurat (patterns of dots). You can also customize tools and then save them (which saves time, because it may take a lot of experimenting to create brushes you like). You can also do watercolors, and there's even an option that simulates wet paper.

You can paint on a blank "canvas" or you can alter an existing image—a scanned photo, say—to turn it into an impressionist painting or a pencil drawing (among many possibilities). Painter's *friskets* (masks that cover part of the image as you continue to paint) can be moved or rotated, and they're easier to create than in other paint programs.

Painter's interface is simple and straightforward, and its tools are realistic. It's a must have program for artists who use the Mac.

Oasis *(Jerry Clement)*

Time Arts' Oasis ($800) is easy-to-learn and has lots of pressure-sensitive tools; like Painter, it lets you create new paintings or modify existing images. One great feature lets you select an area of the image, apply sophisticated special-effects to it and then preview it in thumbnails before making a change.

You can also do tracing, and Oasis has lots of color options, like gradation choices and mixing tools. But it has virtually no scaling, rotation or magnification abilities—an amazing lack in such an expensive program.

Studio/32 *(Jerry Clement)*

Some of the most exact and beautiful computer paintings I've ever seen were created using this $700 program from Electronic Arts. Of the three programs reviewed here, it's the most versatile and useful. Most of the tools are designed with the professional commercial artist in mind, but work equally well for fine art. (It's a supercharged version of Studio/8—Electronic Arts' $300, 8-bit color paint program—which is also great.)

Many of Studio/32's tools are antialiased to smooth the jagged edges in bit-mapped images. There are Bézier curves, handy 3D perspective aids and comprehensive transformation tools that let you manipulate selections with great precision. Studio/32 does gradient fills particularly well, with an intuitive click-and-drag system that gives you easy control over shading. Text goes in its own object-oriented layer, where it's easier to edit, and prints out at PostScript quality.

CAD programs *(Steve Lukrofka/ND)*

Claris CAD (reviewed next) is the most popular CAD program on the Mac. But there are also several others worth considering. MiniCAD ($800 list) has limited 3D-modelling capability and includes a built-in database, spreadsheet and macro language. While not as easy to learn and use as Claris CAD, version 4 (which will probably be available by the time you read this) has a cleaner interface.

AperturePro ($2500) also merges 2D drafting with a database. Generic CADD is slightly less powerful and visibly less elegant than Claris CAD. But it's only $500 and it still does things like globally change symbols on your drawing. And it can also read AutoCAD files directly (without DXF translation).

A lot of architects like PowerDraw ($800) because it's easy to learn and matches their professional needs closely (for example, it measures in feet and inches rather than in decimal feet, as Claris CAD does).

High-end programs like AutoCAD ($3500), Architrion II ($4000), ArchiCAD ($4500), MicroStation Mac ($3300) and MacBravo Detailer ($2000) take a long time to master, and even then they don't magically do away with all of the tedium in the design process.

For presenting a project to clients (or for competitions), many people use 3D programs like those described in the entry below. Architectural-rendering service bureaus use a program called ElectricImage but, at $7500, it's too pricey for most firms to have in-house.

It's also possible to use a 3D program to figure out the basic shapes you want and place them in a context, then work out the detailed plans in a 2D CAD program. Some 3D programs, like ModelShop and Virtus WalkThrough, can read Claris CAD files, so it's easy to view a project with them.

important warning

If you need to exchange files between different programs, make sure each can accept the other's format—and either test them to make sure it's true before buying or get a money-back guarantee.

Claris CAD *(Arnie Burgener)*

Claris CAD is a full-featured, $900, 2D drafting program. I've been using it for several years, and the architectural firm where I work has adopted it with great success.

very good feature

Claris CAD isn't customizable, and it won't generate a bill of materials, but no CAD program I've seen makes as much power so readily accessible. It's fast to learn, and once you've learned it, you can work quickly—actually experiencing the productivity gains that CAD programs frequently promise but don't always deliver. The well-designed user interface is based on MacDraw's tool palette; if you've used MacDraw, Claris CAD will feel very familiar. *[It's true. Even a MacDraw duffer like me can find his way around it.—AN]*

Two sorts of controls have been added to the palette. *Methods* lets you create objects in a variety of ways; for example, you can draw a rectangle from corner to corner, center to corner, with three corners, or with the center, an edge and a corner. *Modifiers* lets you precisely locate objects based on their endpoints, intersections, offsets and tangents.

Combining a tool with its methods and modifiers lets you generate literally thousands of combinations. This produces a very natural drawing environment, more like traditional drafting on paper than the command environment of programs like AutoCAD.

3D programs *(DH)*

mostly for power users

In the world of 3D graphics, power and ease-of-use are extremely subjective and task-dependent. A program might make it easy to design, say, a logo with very little learning time but might have a hard time handling more

realistic objects. So be sure to base your choice of a 3D package on your particular needs and skills.

Creating 3D graphics is essentially a two-step process consisting of *modeling* (creating shapes and placing them in space) and *rendering* (defining other aspects of the objects' appearance). Modeling can be an extremely laborious process if you're trying to create realistic shapes, like an airplane or human being, so if that's what you'll be doing, be sure to get a package with a powerful modeler. There's also a lot of variation in the speed and quality with which renderers calculate the final image.

Many products specialize in either modeling or rendering, rather than trying to handle both; those that do both rarely perform them equally well. Sometimes it makes sense to get one 3D program for modeling and another for rendering; if you do that, make sure the products are fully compatible.

One annoyance that sometimes accompanies 3D images is *aliasing*, or "jaggies." Most renderers offer antialiasing capabilities (though sometimes they go by another name), but the quality varies from program to program, and antialiasing significantly increases rendering times. An alternative is to buy a dedicated antialiasing utility (like JAG, $100 from Ray Dream); it can often provide better results at greater speeds.

Apple thrust Infini-D ($900 from Specular) into the limelight by using it in their demos of QuickTime. It's an impressive program, handling all aspects of 3D modeling (including animation) in an easy and intuitive way. But it's not great at creating complex shapes, and it renders relatively slowly.

Sculpt 3D ($2500 from Byte by Byte) excels as both a modeler and a renderer, but its interface has been criticized as being ponderous and insufficiently Mac-like.

Sculpt's learning curve may be steep, but for demanding applications, the results are worth it.

MacRenderMan (bundled with Showplace for $1000) is based on RenderMan, a scene-description language which is becoming an industry standard. It's strictly a rendering program (although Showplace has some limited modeling capabilities) and must be used with a modeler that supports its RIB format (some that do are Swivel 3D, Zoom, Presenter Professional or MacroMind Three-D). It can produce photorealistic images, but you'll have to delve deeply into its programming language if you don't want them to have a characteristic "MacRenderMan look."

Video Toaster is oriented primarily towards analog video editing, but it also has credible 3D and animation capabilities. If you want all these features, it's certainly worth looking into. In order to use it, you'll have to connect what's essentially an Amiga computer to your Mac, but it's included in Video Toaster's $4600 price tag.

Here are some other programs worth considering:

- *modeling, rendering, animation:* StrataVision 3D ($1000), Presenter Professional ($3600) and MacTOPAS ($5000)
- *modeling, rendering*: Ray Dream Designer ($900), Zoom ($2500) and Alias Sketch! ($1000)
- *modeling, animation:* Aldus Super 3D ($500)
- *rendering, animation, minimal modeling*: MacroMind Three-D ($1500)
- *modeling, some rendering:* form•Z ($1000 for version 1, $1500 for version 2)
- *modeling, some rendering, some animation* Swivel 3D Pro ($700; it also comes bundled with MacRenderMan as SwivelMan for $900)

General graphics software tips

Most of these tips work in any paint program, including desk accessories and the paint layers of combination programs (because they're all ultimately based on the original MacPaint).

double-clicking on tools *(AN/SA)*

Double-clicking on icons in the tool palette of a paint program usually produces some handy shortcuts. (To do this in MacPaint 2, you first have to tear off the Tools menu.)

double-click on:	to:
	change its shape
	enter the magnified view
	toggle between regular and reduced
	erase the whole window
	select the whole window
	lasso the whole window
a pattern box	change that pattern

Shift key effects *(AN/SA)*

The Shift key usually acts as a *constraint* in paint programs, keeping a tool moving in a horizontal or vertical direction (depending on which way you move initially) or keeping shapes that you're drawing of equal length and width. For example:

Shift +	lets you:
	paint straight horizontal or vertical lines
	make straight horizontal or vertical lines
	shift the window contents horizontally or vertically
	erase in straight horizontal or vertical
	create squares
	create circles

very hot tip

alternative erasers (AN)

Here are three alternatives to the standard Eraser in paint programs:

- Use any selection tool (or , for example) and then hit Delete to delete the selection.
- Use —in any convenient size and shape—with white paint (or whatever the background pattern is).
- For really detailed, bit-by-bit erasing (literally), go to a magnified view and use —it changes black dots to white (and vice versa).

global nudge commands (SA/AN)

very hot tip

Every graphics (and page layout) program that contains objects should allow you to move them pixel by pixel (which is called *nudging*). But since some don't, here's how to make your own nudge commands that will work in any object-oriented program.

First, put the Easy Access control panel (described in Chapter 4) in your Control Panels folder. Then put the pointer on top of the object you want to nudge and click. Press Shift ⌘ Clear to activate Mouse Keys, then 0 on the numeric keypad to lock down the mouse button. Now you can use 2, 4, 6 and 8 on the keypad to move the object a pixel at a time down, left, right or up. (When you're done, press Shift ⌘ Clear again to turn off Mouse Keys.)

paint and draw macros (SA/DP/AN/KF)

Macro programs like QuicKeys can be used to supercharge painting and drawing tools. For example, you can use them to instantly draw (or paint) lines or shapes of specific sizes. Record the drawing of the shape while using the Rulers so you get the size you need, then play it back at any time; the same size will be drawn without your having to turn on the Rulers and measure.

important warning

But remember that if you only record the drag of a tool, and not the tool selection itself, the macro will play back

your moves with whatever tool is currently selected in the tool palette. Also remember that since a drag of the mouse is recorded simply as the start and the end points of the drag, and not the path the mouse took between those points, you can't record squiggly lines drawn with ✎ or 🖌:

✎ *a cut-and-switch macro* (SA)

Here's a macro that speeds up cutting between layers in most combination programs. Record yourself selecting *Cut to Drawing* (or *Painting)* from the Edit menu, then hit ⇧⌘/ (this switches layers). The beauty of this macro is that it works from either layer, since the *Cut to* command changes between *Drawing* and *Painting* depending on what layer you're on.

✎ *scaling bit-mapped images* (C.J. Weigand)

When you shrink a bit-mapped image, adjoining pixels tend to clump together, until you have unsightly blotches where once there was finely drawn detail. To reduce a bit map without significant loss of detail, copy it at full size into an object-oriented drawing program, shrink it there and then print it out.

✎ *quick lassoing* (AN)

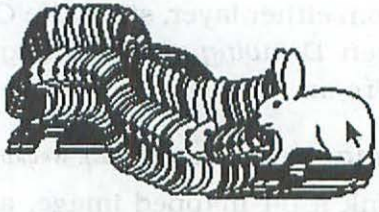
You don't have to draw a complete loop around a bit-mapped image with ⌾ to select it. The loop you make is automatically closed with a straight line between where you start and end the Lasso drag.

✎ *the* ⌥ *copy* (SA/AN)

You can duplicate selections in a paint program by copying and pasting them, but there's an easier way. First, make the selection, then press ⌥ while dragging it.

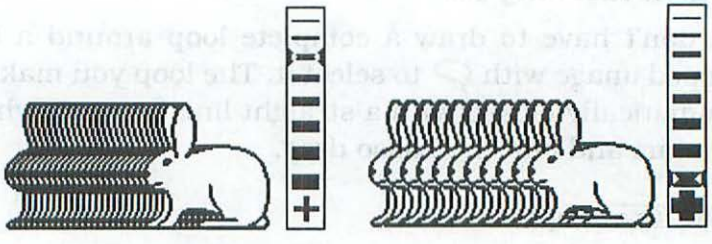
Instead of moving the original, you'll peel away an exact copy. When you have it where you want it, just release the mouse button. Here's what happens with a lassoed rabbit (assuming you can manage to lasso one) when you Option-drag:

To make repeating copies, hold down ⌘ too—in most paint programs, you'll leave images behind as you drag the selection. The more slowly you drag, the more copies there'll be:



Holding down Shift as well (which means Shift Option ⌘ in total) keeps the dragged copies in a straight line.

To make the spacing even between the copies, adjust the line width and drag slowly. The width of the line defines the minimum spacing between the copies:



Canvas tips

These tips work in Canvas 3.

turn off unnecessary tools (DP)

Canvas takes up a lot of disk space and memory. You can save some memory by pressing Spacebar while the program is loading—this gives you a list of tool modules so you can turn off the ones you don't need.

faster screen redrawing (DP)

Canvas can take a long time to redraw the screen, especially when you're working in color. To speed redrawing, work in black-and-white as much as possible and hide any layers you don't need to see. (To do that, choose *Layer Specs* from the Layout menu and deselect the *Visible* checkbox for each layer you want to hide.)

quick alignment of duplicates (DP)

Whenever you select an object and hit ⇧⌘D, a duplicate appears slightly below and to the right of the original. To align them horizontally, hit ⇧⌘↑; to align them vertically, hit ⇧⌘←.

double-click for quick editing (DP)

You can automatically switch to text-editing mode (even if the pointer is an ↖) by double-clicking a text object. (To return to an ↖ pointer, hit Enter.) If you click on an object drawn with the FreeHand, Polygon or Bézier tool, a handle appears in each of the four corners of the bounding rectangle. To reshape the object, you drag one of the handles. To *resize* it, double-click instead, and control points appear on the handles.

twisting text outlines (DP)

Here's how to create logos and other fancy text effects. First, select a text block and choose *Create Béziers* from the Text

menu. Canvas will now turn the text into Bézier-curve outlines that match the original type outlines perfectly (this only works for PostScript or TrueType fonts).

Next, choose *Ungroup* (on the Object menu) *three* times. Now you can drag any control-point handle to twist, stretch or reshape any letter.

SuperPaint tips

The tips in this section all work in SuperPaint 3, and most work in earlier versions as well.

switching layers *(SA)*

You usually toggle between the Paint and Draw layers by clicking on the icons at the top of the tool palette, but there's also a keyboard equivalent: ⇧⌘/.

moving inactive windows and palettes *(SA)*

As in the Finder, you can move a SuperPaint window without making it active by holding down ⌘ while you drag it by its title bar. This also works on the tool and pattern palettes, so if they overlap anyplace and you want to move the bottom one without having it come to the top, hold ⌘ while you drag the floating window to its new position.

the Close All command *(SA)*

If you hold down Option while opening the File menu, the *Close* command changes to *Close All*. As in the Finder, you can also Option-click in the close box of any open document window and all the windows will close. (If any of the documents have been edited, you'll be asked if you want to save the changes.)

zooming shortcuts (SA)

There are two shortcuts for jumping from regular view to maximum magnification (8x). Double-clicking on in the palette centers the magnified view around whatever was in the center of the last view. ⌘-clicking with anywhere in the document centers the magnified view around the spot you click on.

nudge arrows (SA)

The *Left*, *Right*, *Up* and *Down* commands in the *Nudge* submenu (in the Edit menu) have easy keyboard equivalents: ←, →, ↑ and ↓.

Paint/Draw from Center or Corner (SA)

A shortcut for choosing the commands *Paint (Draw) from Center* and *Paint (Draw) from Corner* is to double-click on the rectangle, rounded rectangle and circle tools in the palette. When *Paint (Draw) from Center* is active, small crosses appear in the centers of the shape tools in the palette.

smaller eraser (SA)

Holding Option while you use changes it from a sixteen-pixel square to an eight-pixel square.

power-erasing the Paint layer (SA)

Double-clicking on erases everything in the Paint layer that's showing in the window. Holding down Option and ⌘ while double-clicking on erases the entire paint layer regardless of what portion is showing in the window.

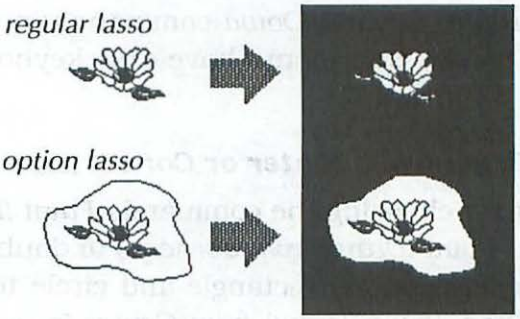
tricks (SA)

As in most paint programs, if you press ⌘ while using , it shrinks down (as soon as you let go of the mouse button) to the smallest size that will enclose all the black pixels of the selected area.

If you hold down Option while using ⬚, the selection is lassoed as soon as you let go of the mouse button—and the current tool switches to 🪢.

tricks (SA/AN/KF)

Pressing Option while you use 🪢 keeps it from shrinking when you let go of the mouse button. It stays where you traced it, enclosing any white space you selected.



the x-ray 🪢 (SA/AN/KF)

very hot tip

Holding ⌘ while you lasso activates "x-ray" mode. No white parts are selected, even if they're totally surrounded by black.

selecting all (SA)

When used on the Paint layer, the *Select All* command (in the Edit menu) normally selects the layer in a rectangle as large as the page. If you hold ⌘ while you choose *Select All*, the rectangle shrinks to the smallest size possible that encloses all the black dots in the document. If you hold

Option while you choose *Select All*, everything in the Paint layer is lassoed and the current tool switches to .

text boxes in the Draw layer (SA)

When you click somewhere in the Draw layer with I, the initial width of the text box extends from the point of the click to the right edge of the window. Although you can always resize the text box in the normal way (by dragging on a handle), it's easier to start with something close to what you want. So instead of clicking with I, use it to drag the text box to the width you want.

picking up patterns (SA)

Here's a trick that works with both the Pattern Edit and Brush Shape dialog boxes. When the dialog box is open, move the pointer outside the box, press the mouse button and drag the pointer around. Anything beneath the pointer is "picked up" and sent to the edit area of the dialog box. This lets you take any pattern from the screen and make it either a defined pattern in the palette or a brush shape. (This also works in MacPaint.)

You don't have to keep the click inside the document window for the pickup: it works anywhere on the screen.

⌘-click *invert* (SA)

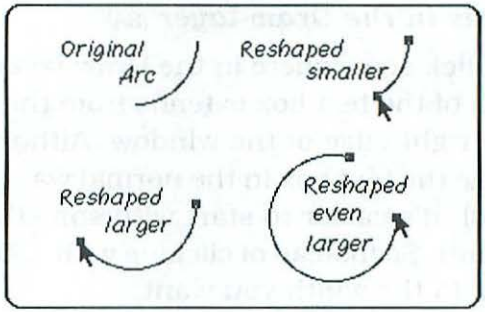
In both the Brush Shapes and Pattern Edit dialog boxes, a ⌘-click in the edit area reverses the black-and-white pixels of the pattern.

arcs (SA)

The Arc tool makes either a wedge (like a slice of pie, if there's a paint pattern selected) or an arc (if the *None* pattern is selected) but either way, a quarter of an oval is created.

If you want more or less of an arc, you can do it in the Draw layer. Draw an arc, choose *Reshape Arc* from the Draw

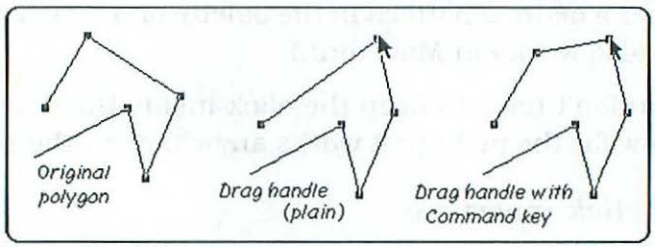
menu and drag one of the arc's handles to continue the curve or shorten it.



✎ *adding "corners"* (SA)

very hot tip

When you use the *Reshape Polygon* command on a polygon in the Draw layer, you can not only drag the original "corners" to reshape it but you can also add new corners. Just hold ⌘ down as you move a handle and a new handle will be dragged out of it.



✎ *skipping dialog boxes* (SA)

shortcut

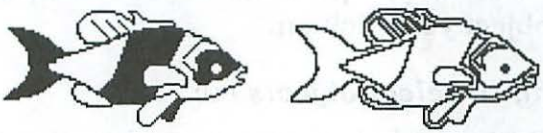
You can bypass some dialog boxes whose settings you don't want to change by holding down Option while you choose the command from the menu. For example, if you want to scale a selection to the same proportions as the last time you used the *Scale Selection*, just hold down Option while choosing *Scale Selection*. The dialog box won't open and the current settings will be used. This also works for the *Other* command (for point sizes, in the Text menu) and the *Rotate Selection* command in the Transform menu.

white outlines around graphics (SA/AN)

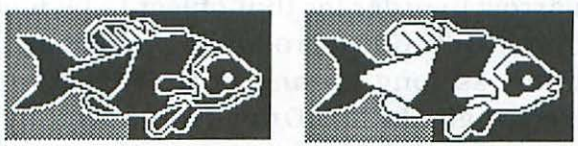
Here's how to place a solid black graphic against a black or patterned background with a white outline around it to make it visible. First, select the graphic with the lasso and choose *Trace Edges* from the Paint menu. Next, drag the selection against the background (don't click anywhere to deselect it yet). Now choose *Invert* from the Paint menu.

lasso *trace edges* *drag against background* *invert*

To put a white outline around a more complex graphic, you need a few extra steps. (This tip only works for graphics with a solid outline, where there are no breaks in the perimeter of the figure for the Lasso to slip into.) First, select the graphic with the lasso and pull out a copy of the graphic by holding Option as you drag. Now choose *Trace Edges* from the Paint menu, drag the copied item against the background, and choose *Invert* from the Paint menu. Finally, lasso the original graphic and drag it on top of the inverted figure.



original *1. trace edges (of copy)*



2. invert against background *3. drag original on top of inversion*

MacDraw tips

The tips in this section work in MacDraw Pro 1.5 and MacDraw II, and most will work in earlier versions as well.

Shift commands (SA/DP)

Here are keyboard equivalents for a few MacDraw commands that aren't on the menus:

- Shift ⌘ A selects all the objects in the *document* (as opposed to all the documents in the *layer*, which is what *Select All* does).
- Shift ⌘ V rescales an image to the current ruler settings as you paste it.
- Shift ⌘ W cycles through the opened windows.
- Shift ⌘ M toggles between 100% view and the last zoom level that you set.

moving horizontally or vertically (C.J. Weigand)

As in most Mac graphics programs, you can force an object (or group of objects) to move exactly horizontally or vertically (and nothing in between) by holding down Shift as you drag. But in MacDraw, be sure to press the mouse button down before you press Shift or you'll simply deselect whatever object you click on.

dragging to select objects (SA)

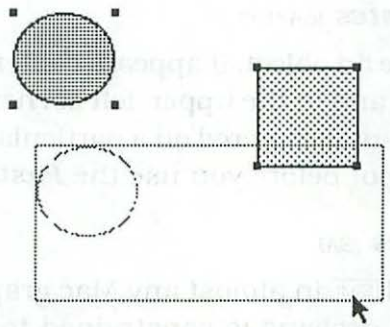
In some object-oriented programs, you have to *completely* enclose an object in the rectangle you drag with the selection arrow in order for that object to be included in the selection, while other programs include an object in the selection as long as *any part* of it is within the dragged rectangle. In MacDraw, you normally have to completely surround an object, but if you hold down ⌘ while you drag, you'll get any object that's even partially covered.

selecting through layers (SA)

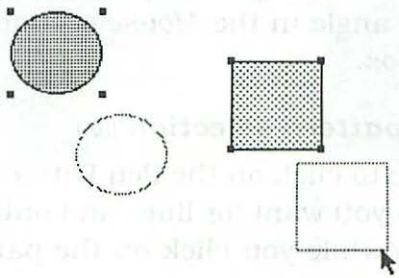
When you click on an object and its handles don't appear (to indicate that it's been selected), it's probably in another layer. If you don't want to switch layers to get it, just Option-click on it.

dragging object outlines (SA)

When you move more than one object at a time, all you'll see is an outline of the last object selected inside a gray rectangle that shows the overall dimensions of the entire selection. (In the illustrations below, the filled circle is the last object selected and the empty circle is its outline.)



If you want to see outlines of the individual objects in the selection, hold ⌘ while you drag:



retaining the tool you're using (SA)

When you draw a shape, or type text, the pointer normally reverts to the selection arrow as soon as you're done. If

you want to retain the tool so you can use it again immediately, double-click on the tool in the palette to select it (instead of the usual single click).

✎ two ways to copy text *(C.J. Weigand)*

If you select a block of text with ↖, copy it to the Clipboard and then paste it into a page layout or word processing program, it will become a PICT image that can be stretched or reshaped but not edited. (For more on this, see *creating special typographic effects* in the fonts chapter.) If you select the same text with the text tool (I), it will transfer as editable text.

✎ placing pastes *(SA/DP)*

When you paste an object, it appears centered in a window in MacDraw II, and in the upper-left corner of the window in Pro. If you want it centered on a particular point instead, click on that spot before you use the *Paste* command.

✎ angled lines *(SA)*

When you hold Shift in almost any Mac graphics program, the line you're drawing is constrained to the horizontal or the vertical, or sometimes the 45° angle between. This is also true in MacDraw, but you can change that in-between constrained angle to anything you want by typing in the desired angle in the *Mouse* section of the Preferences dialog box.

✎ quick Pen pattern selection *(SA)*

You don't have to click on the Pen Pattern box and then on the pattern you want for lines and outlines—instead, just hold Option while you click on the pattern you want for the pen.

✎ changing the ruler's zero point *(SA)*

To change the position of the zero point on the ruler (it's usually at the extreme top and left of the ruler), just click

anywhere on the ruler with ↖. If you have the grid turned on, the zero point will jump to one of the grid lines. If you don't want this to happen accidentally by a slip of the mouse, click the *Zero point locked* button in the Rulers dialog box.

Illustrator tips

The tips in this section work in Illustrator 3.2 and most will work in earlier versions as well. The first two entries also work in FreeHand (with a few minor differences).

changing tools and zooming *(SA/Hal Lewis/AN)*

Three tools are used more often than others in Illustrator (and FreeHand)—the arrow pointer, the grabber hand for moving the page around on the screen, and the magnifying glass. You can temporarily change to any one of these tools without going to the tool palette, by pressing the following keys:

Tool	Keyboard command	Tool	Keyboard command
↖	⌘	🔍+	⌘ Spacebar
✋	Spacebar	🔍−	⌘ Spacebar Option

Holding down Option will change the plus sign in the magnifying glass (enlarging) to a minus sign (reducing the view) and vice-versa. When no sign appears, that means you can't zoom any further in the current direction.

When you click in the document with the magnifying glass, the zooming is centered around where you clicked. If you want to zoom on the center of the window, double-click on the magnifying glass in the palette instead. A plain doubleclick magnifies the view; an Option doubleclick reduces the view. (This last wrinkle works differently in FreeHand.)

draw from center *(SA/Arnie Burgener)*

To draw ellipses, rectangles and rounded rectangles from the center out instead of from the corner, hold down Option before you begin to drag. (In Illustrator 3, you also get the draw-from-center option on a box that pops out when you select the rectangle or ellipse tool.)

a couple of shortcuts *(SA)*

Double-clicking on ☜ in the tool palette will take you to the *Fit in Window* view. If you hold Option down, it will take you to *Actual Size*.

To temporarily switch from the freehand drawing tool to the pen tool or vice versa, press Control. When you release the key, you get the original tool back again.

the Shift constraint *(SA)*

As with most programs, holding Shift constrains the line you're drawing to the horizontal or vertical—or to the 45° angle in between. But the 45° angle changes according to the constraint angle you define in the Preferences dialog box—so if your lines aren't at the angle you expect, check the preferences settings.

editing basic shapes *(SA/Arnie Burgener)*

When you use a basic shape tool (ellipse, rectangle, round rectangle), it actually draws a series of lines and curves to make the shape. The direct selection tool—the hollow arrow on the tool palette—lets you select the separate components of a shape so you can edit it. For example, here's the quickest way to get a half-circle in Illustrator 3: Draw a circle (hold Shift to keep it round), then choose the hollow arrow on the tool palette. Now Shift-click or drag the selection marquee to select the two quadrants of the circle you don't want, and hit Delete.

the Option copy (SA/ByB)

The Option-copy trick that works in most paint programs also works in Illustrator—press Option as you drag a selected object and a copy will be dragged out of the original. (Actually you'll always see a copy as you drag an object. If you press Option before the drag is complete, the original will remain, as well as the copy—otherwise it disappears.)

using the arrow keys (SA/Arnie Burgener)

The arrow keys (↑↓←→) move a selection a pixel at a time in the indicated direction—unless you specify a different unit of measure in the *Cursor Key Distance* field (in the Preferences dialog box).

missing page breaks (SA/SM)

If the dotted lines that indicate page breaks aren't showing in your document, it just means you haven't selected a printer in the Chooser yet.

partial tracings (SA)

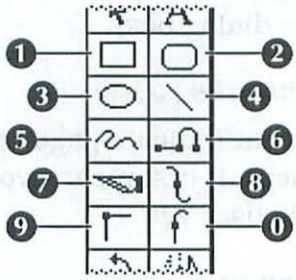
When you click on a bit-mapped shape with the Autotrace tool, it traces the entire item. If you only want to trace a section of a shape, don't click the tool. Instead, drag it on the shape—the tracing will start at the spot you started your drag and end at the spot you stopped dragging. In the illustration below, for example, dragging the line shown would cause only the wing to be traced.

FreeHand tips

The tips in this section work in FreeHand 3 and 3.1 and most will work in earlier versions as well. The first two entries in the Illustrator section above also apply to Freehand (with a few minor differences).

keyboard tool selections *(SA/Hal Lewis)*

You can switch to any of FreeHand's basic shape tools simply by pressing a number key on the keyboard. These keyboard commands work even if the tool palette isn't open.



deselecting from the keyboard *(SA)*

To deselect everything in the document, press Tab. (This is useful when you've selected a small element on top of a larger one and can't click anywhere to deselect it without selecting the larger one.) To deselect points on a path without deselecting the path itself, press ⇧.

zooming in and out *(SA/DP)*

Everything works the same as in the entry called *changing tools and zooming* in the Illustrator tips section above, except that to zoom in or out on the center of the window, you use the *Magnification* subcommands in the View menu.

editing basic shapes *(SA/SM)*

When you draw an oval, rectangle or rounded rectangle, you've actually drawn a series of lines and curves that

are automatically grouped. But they can be ungrouped and edited. For instance, to draw a perfect half-circle, draw a circle (hold Shift to keep it round) and choose *Ungroup* from the Element menu. Four points will appear on the circle. Using the knife tool, Shift-click two opposite points and then deselect everything. Select the half of the circle you don't want and hit Delete.

❦ *deleting elements or parts* (SA)

When you press Delete, what's deleted depends on what's selected. If an entire element is selected, it disappears. If just a corner of it's selected, the corner disappears and the path closes, joining the corners on either side of the deleted one.

❦ *transformation dialog boxes* (SA)

Instead of using transformation tools like scale, skew and rotate to drag an element on the screen, Option-click on the element you want to transform. A dialog box will open into which you can type the transformation values and get exactly what you need right away.

❦ *tracing scanned line art* (Andreas Jones)

FreeHand isn't very good at tracing scanned art (turning TIFF or PICT images into editable PostScript) but Streamline is. It can only save files in Illustrator format, but if you use Illustrator 1.1 format, FreeHand can open the files.

❦ *optimal resizing* (SA)

To resize a graphic to its optimum size for the resolution of the printer you're using, hold Option while you drag on the element's handle to resize it. But first make sure you've selected the correct printer in the Document Setup dialog box. If you're proofing things on a laser printer but will end up on an imagesetter (say), choose the imagesetter, so the graphics will be sized correctly for the final output.

scaling text on a path (SA)

The effect of scaling text on a path depends on whether or not you've grouped the text and the path. (Text on a path is always "stuck" to the path, so that selecting the path also selects the text—but that's not the same as the text and path being grouped with the *Group* command.) If the text and the path aren't grouped, scaling changes only the size of the *path* and doesn't affect the font size. If the text and the path are grouped, scaling also changes the font size.

text block manipulations (SA)

Dragging the corner handle of a text block changes the size of the block and rewraps the text in it, but dragging any of its other handles, or dragging a corner handle with Option held down, changes the text inside. In each case, the change to the text mirrors the change to the text box so the box remains filled—top to bottom, side to side—even in its new size.

So dragging on a top or bottom handle changes the line spacing; on a side handle, it changes the letter spacing (or, if you hold down Option, the word spacing). Dragging a corner handle while holding down Option resizes the type to fit in the new block size; if you also hold down Shift, it resizes proportionately.

Clip art

beautiful vs. useful? (AN)

There seems to be an idea afoot that business graphics need to be simple cartoons. Detailed, painterly drawings are seen as somehow frivolous and therefore not businesslike. I don't understand this. With the exception of things like charts and graphs, business graphics *are* illustrations. The prettier they are, the better.

It is true, of course, that some kinds of illustrations are more likely to be useful than others. But given a choice between a beautiful drawing of a pair of pliers and an ugly drawing of a pair of pliers, a hardware store would be wise to use the former.

Even art that doesn't apply directly to your business can be put to good use. A flyer with a gorgeous picture of a bird on it (say) might well sell more desks than one with nothing on it but minimalist cartoons of desks. I'm not saying you never need simple, practical drawings, but beautiful, seemingly irrelevant drawings have their place in business communications too.

❦ *choosing clip art* (AN/SM)

In this section (and throughout the book), we show you some examples of Mac clip art, but it's a minuscule sampling of everything that's out there. For a better idea of what's available, get Erfert Fenton and Christine Morrissett's *Canned Art: Clip Art for the Macintosh* (Peachpit Press). Now in its second edition, it shows you more than fifteen *thousand* miniature images from 34 clip art packages, along with some introductory material on graphics formats and utilities.

Canned Art costs $30, but it contains coupons worth more than a thousand dollars in discounts on clip art packages (you won't use them all, of course, but you only have to use $30 worth to make the book free). If you already own a lot of clip art, this book's excellent, detailed index can help you find the image you need.

❦ *Visual Delights* (AN)

My favorite collection of clip art is Visual Delights from SunShine. You get *5800!* images on a CD for $333 (less than 6¢ an image!)—or you can buy any of 67 floppy disk sets, each of which averages 68 images and costs $40. Almost all the art is in TIFF format—that is, 300-dpi bitmapped images—and it's *really* beautiful.

very good feature

Put together by a couple in Texas, Visual Delights took two years to compile. (This is the kind of project for which the phrase *magnum opus* was invented.) The CD comes with a program that lets you search for pictures by keywords and/or titles, and contains a 10½-megabyte catalog with thumbnails of all 5800 images. There's also a file called Folder Hierarchy that shows how the pictures are organized, but the search program is usually the easiest way to find something.

I like Visual Delights' images so much that, rather than show you samples here, I've used them throughout the book, wherever there's blank space at the end of a chapter. If you want to look at a bunch of them together, rather than simply happen upon them as you read through the book, you can locate them by looking in the index under *Visual Delights, illustrations from.*

WetPaint *(AN)*

very good feature

WetPaint is another wonderful collection of clip art. There are five packages of modern illustrations and four of art from the turn-of-the-century; all contain three 800K disks. The final (two-disk) set is on an Egyptian theme. Each package costs $90.

very good feature

All the WetPaint disk sets come with two desk accessories: ArtRoundup, which lets you open paint files from within another application and edit them with all the usual paint tools, and PatternMover, which lets you edit MacPaint patterns and transfer them between files. WetPaint's manuals are well-written, clear and complete, and they contain printouts of all the images on the disks. Here are a few of my favorites from the WetPaint collection:

ClickArt *(AN)*

T/Maker published the first package of Macintosh clip art way back when; now it has eight volumes of bit-mapped images ($60 each), five of EPS images ($130 each) and one of color graphics (designed to be used with presentation software, it costs $150). Here's a ClickArt illustration

you can use for a party during the winter, or for a formal party any time of year:

And here's a sample of ClickArt's EPS art:

QuickArt *(AN)*

A company in Champaign, Illinois called Wheeler Arts has been publishing QuickArt since 1985. They have eight bit-mapped collections ($35 each) and four EPS collections ($25 each, $80 for all four). Here's a sample:

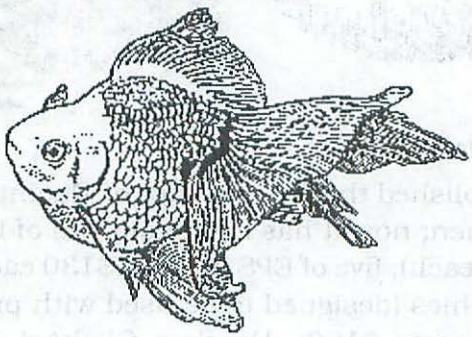


Image Club Digit-Art (AN)

Image Club, many of whose excellent fonts we describe and display in Chapter 6, also offers a wide selection of EPS graphics on CD-ROM. There are twenty-four collections of various sizes (ranging from about two megs to about five), each of which costs $100 (you send them your money and they send you the code that unlocks them on the CD, so you can copy them onto your hard disk). Or you can get the whole collection, unlocked, for $800. Here's a sample:

Multi-Ad Services (AN/SA)

If you've ever wondered how what you're doing will play in Peoria, there's an easy way to guarantee that it will do OK. Peoria-based Multi-Ad Services offers two collections of EPS clip art, and if they don't know how it will play in Peoria, who will? Here's a sample:

clip textures (DH)

Most 3D programs come with libraries that contain common textures like marble and wood, but you're likely to want more. You can digitize your own additional textures

on a scanner (a time-consuming and technically demanding process) or you can buy a collection of clip textures.

Wraptures One, a $130 CD from Form and Function, has 600MB of excellent high-resolution textures. V.G. Shaders by the Valis Group has three volumes, from $300 to $350 each, that augment MacRenderMan's texture collection. Folio I ($400 from D'pix) gives you 100 medium-resolution images and one high-resolution image (with the option to buy more).

Scanners

scanners (JM/AN)

mostly for beginners

Scanners are devices that convert images—typically photographs or other artwork—into digital form so they can be stored and manipulated by computers. Mac-compatible scanners range in price from a few hundred dollars to a hundred *thousand* dollars. The ones under $10,000 are great for jobs that don't require precise detail or color reproduction, but they can't compete with high-end equipment when it comes to demanding jobs like color photographs in slick publications.

There are more than a hundred scanners on the market today. The models change frequently and there are often variations even between one individual unit and another. So rather than give you reviews of particular brands (which might be out-of-date before the ink on this book is dry), this section instead tries to explain, in general terms, what to look for when evaluating scanners.

types of scanners (JM)

mostly for beginners

There are three major types of scanner:

- *Hand-held scanners* you literally roll across the artwork. They're small and relatively inexpensive, but they only

scan in strips about four inches wide. Some come with software that lets you piece together multiple scans to build a larger image, but this process is annoying and imprecise. Also, images are often distorted, because it's impossible to roll a hand-held scanner without wavering or changing speed.

- *Flatbed scanners* operate like photocopiers; you place the artwork on a glass surface and a scan head and light source move across under the glass. Flatbeds can scan almost anything that has at least one flat side, even a slab of marble. Most of them can't scan transparencies and slides, but a growing number of manufacturers offer attachments for that purpose. All flatbeds will scan up to at least 8½" x 11", and some go up to 11" x 17".
- As their name suggests, *transparency scanners* scan transparent materials. (*Slide scanners* might be a more appropriate term, since units that can scan transparencies larger than 35mm tend to cost over $20,000.)

how scanners work *(JM)*

All but the most expensive Mac scanners use a *CCD* (charge-coupled device), a chip that's covered with small light sensors. During scanning, light is reflected off (or passed through) the artwork and focused onto the CCD sensors, which convert the light energy to electricity. The more light reflected at each point where the scanner takes a reading (called *sample points*), the stronger the electric charge. (So light colors are represented by the strongest charges, dark colors the weakest.)

The electric charges are in analog form—that is, their strengths vary on a continuous scale. But since computers can only read digital information, a second chip or set of circuits is needed to assign a numerical value to each of the charges. This process is called *analog-to-digital conversion.*

Color scanners use colored filters (or sometimes a prism) to read red, green and blue values separately,

then combine the three single-color scans to yield a full-color image.

bit depth (JM)

Scanners come with different *bit depths*. The greater the bit depth, the more shades or colors the scanner can read at each sample point.

1-bit scanners read all sample points as either black or white. There aren't very many of these around anymore. Most people use 8-bit gray-scale scanners (for 256 shades of gray) or 24-bit color scanners (256 shades each of red, green and blue, for a total of more than sixteen million colors). To see all the tones such scanners can capture, you need a gray-scale or color monitor and lots of memory—the files are *big*—but the image quality is much better.

Some flatbed and transparency scanners read 36 or 48 bits of information at each sample point, even though their final product is a 24-bit file. Doing this reduces the amount of *noise* (inaccurate data) that CCDs inherently produce. (The less noise there is in relation to total data collected, the more usable information the scanner can deliver.)

A common problem when you alter scans is that you lose information—if you brighten colors, for example, you might lose image detail. But when you scan 48 bits, you can tell the scanner to digitally convert only the brightest sixteen million colors (say), so that its final 24-bit image contains the best information.

resolution (JM/AN)

A scanner's *resolution* refers to the number of sample points per inch it's capable of capturing (usually quoted in *dpi—dots per inch*—just like printer output). Some scanners are also rated in terms of *total resolution*, the maximum number of points they can sample. To compare these two figures, divide the total resolution by each

dimension of your intended output, then average the two figures. For example, a scanner whose total resolution is 2000 x 3000 dpi can output a 5" x 7" image at a resolution of about 415 dpi (2000/5 = 400; 3000/7 = 428.6; (400+428.6)/2 = 414.3).

High-resolution scanners are expensive, so don't get more resolution than you need. What you need depends both on how fine and how large the final image needs to be. For example, let's say you're using your scans to produce halftones, for printing. The resolution of halftones is measured in *line screens*—an 85-line screen, a 133-line screen, etc. (For more on this, see the entry called *halftones* in the laser printer tips section of Chapter 5.)

As a rule of thumb, you should scan at a dpi of no less than 120% of the line screen you'll use for printing. So if you need a 150-line halftone, scan at 180 dpi or more. You can increase the sharpness of your image by increasing the dpi you scan at, up to about 200% (300 dpi for a 150-line screen, say); beyond that, you get diminishing returns. If your scans are destined to appear on computer screens, the same rule of thumb applies, but use the screen's resolution, usually 72–75 dpi, instead of the halftone screen.

When you scale an image up, you reduce the resolution correspondingly (doubling it, for example, cuts its resolution in half). This is where most people come up against the limitations of their devices. For example, if you have a 300-dpi scanner and want to output a 150-line halftone from a 35mm slide at a scan-to-output ratio at 150%, the printed image can only be about 2" by 1.4".

Manufacturers and salespeople often quote an *interpolated resolution* figure, because it's higher than the true, *optical resolution* figure. *Interpolation* means the software looks at actual sample points it's scanned and makes an educated guess about what the points between

them might look like. It's invaluable for producing smooth, jaggie-free scans of line art, but it's not a substitute for optical resolution.

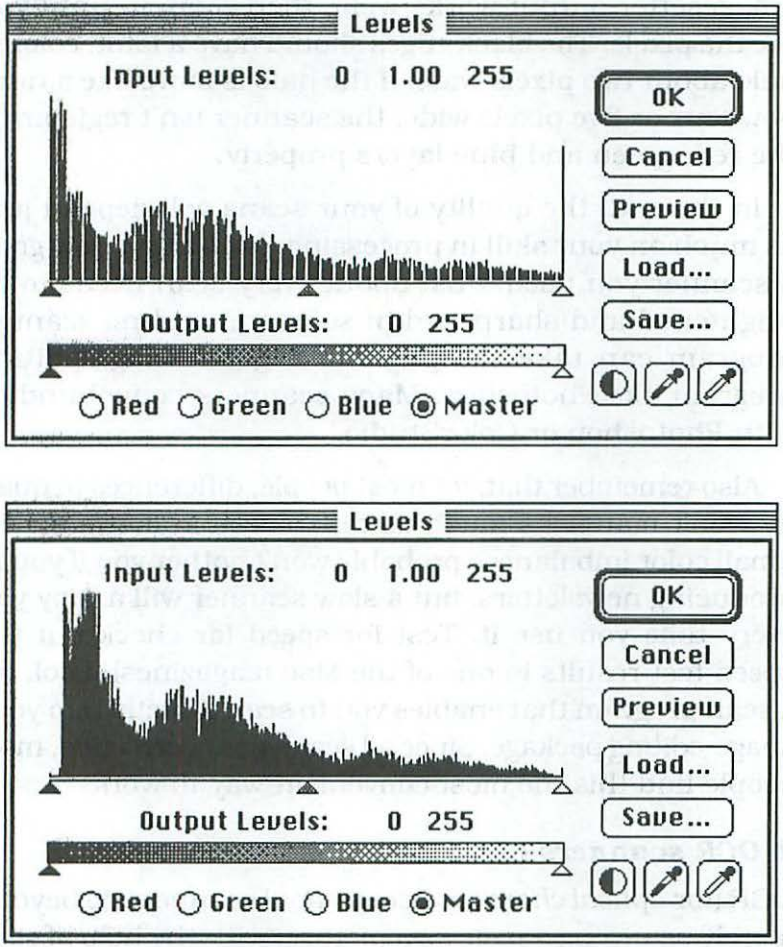
evaluating scanners *(JM)*

Evaluating scanners is easy if your scanned images will only be displayed on the screen; just do some test scans and compare the results on a monitor like the one you'll be using. The best images to use for tests contain fine detail and a mix of bright and muted colors; a human face is ideal, since small tonal shifts can make it look totally wrong.

If your scanned images will be printed out, don't try to evaluate them on a screen. Scans that look dull on a screen may actually contain better data for printing than those that look bright and colorful. It usually isn't possible to make a scan and then print it on the output device you're planning to use, but you can at least avoid some of the most obvious and common problems by making a few test scans and analyzing them with Photoshop's Levels chart (other image-editing programs have similar capabilities).

First, make sure that the values in the chart don't continue off the scale, and that the chart has no gaps in it; either may be a sign that the scanner is making brightness and contrast corrections you didn't ask for, or that it can't read pure black or pure white. (With color images, you'll probably have to look at the red, green and blue levels separately to see the gaps.)

In the chart at the top of the next page, the values spill off the ends of the graph and there are gaps—both indications that data has been automatically adjusted. In the second chart, the values fit within the scanner's range, and the output of this scan will contain more image detail.



Next, look for excessive noise (this test works best with images that have dark areas in them). You do this by moving to the left the light gray (middle) triangle (it's just above the *l* of *Output Levels* in the windows shown). As the dark areas of the picture lighten up, check them for streaking and random mottling. There will always be some noise, but if you try a few different scanners, you'll quickly see how they vary.

To test the sharpness of color scanners, scan a piece of line art or text that's printed on very glossy stock

(imagesetter output works well), then zoom in until you see the pixels. The black edges should have a faint, colored halo about two pixels wide. If the halo is more like a rainbow four or five pixels wide, the scanner isn't registering the red, green and blue layers properly.

In the end, the quality of your scans will depend just as much on your skill in processing them as on how good a scanner you used. Just about every scan needs to be brightened and sharpened in software, and no scanner program can take the place of a good image-editing program like Photoshop. Many scanners come bundled with Photoshop or ColorStudio.

Also remember that, for most people, differences in quality won't matter as much as differences in convenience. Small color imbalances probably won't bother you if you're producing newsletters, but a slow scanner will annoy you every time you use it. Test for speed (or check out the speed test results in one of the Mac magazines). Look for a scan program that enables you to scan directly into your image-editing package. Since all scans need correction, most people find this the most convenient way to work.

OCR scanners *(JM)*

OCR (for *optical character recognition)* scanners go beyond merely scanning a page as a picture; with the help of software, they recognize the letters and store them as actual characters, editable in a word processing (or other text-handling) program. Make sure any one you buy lets you scan from within the OCR software you want to use; otherwise you'll have to scan a page, save it as a graphic and then open it with your OCR software (described in the next entry).

OCR really isn't worth getting involved with unless you're going to be digitizing lots of documents. And if you're going to be digitizing lots of documents, you'll want a scanner that's fast.

Bit depth is irrelevant for OCR, since you'll be scanning in 1-bit (black-and-white) mode anyway. And the standard flatbed resolution of 300 dpi is more than enough.

Some OCR scanners pull pages through a series of rollers. This means you can't scan books (or anything else that you can't tear into single sheets) and the rollers have a tendency to mangle documents. Flatbeds are by far the best choice; the same problems that limit hand-held devices for image scanning make them a pain for reading documents.

OCR software (SB)

Because most people expect OCR software to instantly and magically put text into their computers, they're often disappointed with the reality. OCR conversion takes time, and just as typists make mistakes, so do the programs.

You get the quickest and most accurate results from clean, clearly typed pages with simple layouts. If your Mac has at least a 68030 processor and eight megs of RAM, you may be able to process a couple of such pages a minute. (Though some OCR software claims to work with small, slow Macs, don't even bother; you won't be happy with the results.) Figure on more time (and more errors) if you're scanning complex multiple-column magazine layouts with graphics; book pages with footnotes, figures and captions; faxes; dot-matrix printouts; newspaper clippings or fourth-generation photocopies.

Because of the time it takes, an important feature to look for is *deferred processing*, which lets you scan pages to the hard disk as graphics—then let the OCR software process them while you're at lunch or home for the night. (Deferred processing requires a big hard disk, though.) All the good OCR software processes foreign languages as fast as English, but more slowly if different languages are mixed on a page.

When you consider the cost of the hardware and software, you may be better off hiring a typist, unless you have hundreds or thousands of pages to scan into the Mac.

✎ *OmniPage* (SB)

As of this writing, OmniPage products from Caere (pronounced *CARE)* are about the fastest and most accurate OCR programs for the Mac. (TypeReader—$700 from ExperVision—is a bit faster, but it's interface isn't very Mac-like.)

OmniPage Professional ($1000) has all the tools you'd want and more—a good text editor, a spelling checker that's fine-tuned to hunt for common OCR errors (like substituting *rn* for *m),* the ability to capture grayscale graphics while you scan text and deferred processing. Like most OCR programs, it lets you select parts of a page to convert, so you don't waste time processing words you don't want. It requires System 7 and five megs of RAM, but works best with eight megs.

People with more modest needs—or budgets—might prefer OmniPage Direct ($600), which doesn't let you defer processing. It uses the same recognition method as Professional, and works with the same speed and accuracy, but it functions as a desk accessory, converting text and pouring it into the active application's window. Then you edit or format the text. A trial version comes bundled with some scanners; you can upgrade to the full-powered DA for $300.

✎ *LightningScan* (John Grimes)

As hand-held scanners go, Thunderware's LightningScan Pro 256 ($650 list) and LightningScan 400 ($500 list) are hard to beat. Working with ThunderWorks software, both allow the mating of side-by-side 4" scans.

Cleverly numbered to confuse, both models scan at up to 400 dpi. For the extra $100 or so, the Pro 256 generates 256 shades of gray rather than 32. If you want to scan photos, that's not a bad investment.

There's also a $360 LightningScan Compact for the Classic, SE/30, SE (with a high-density disk drive), LC and si (LC's and si's also require a special $20 cable). I didn't test this model.

MicroFrontier's Enhance 2.0, image-enhancement software that handles grayscales but not color, comes free with the Pro 256. All three models include Olduvai's Read-It! OCR software. *[I strongly advise against using hand-held scanners for OCR. For large jobs they're painfully slow, and for smaller ones, you'd be done faster if you just started typing. If you insist on doing OCR with a hand-held scanner, though, the best software is Typist Plus Graphics ($700 from Caere).—SB]*

ScanMan *(John Grimes)*

If jazzing up correspondence or simple flyers is all you're after, then a $500 hand-held, gray-scale scanner like ScanMan from Logitech might be the better alternative to a $1000 flatbed.

ScanMan 32 worked just fine on small pieces of line art—the 300-dpi output on a LaserWriter was surprisingly crisp and clear. Scans of photos ranged from acceptable to disappointing and revealed the problems of outputting more shades of gray than were actually scanned (ScanMan interpolates the difference).

An even more significant limitation is the skinny scan width of 4.1". While ScanMan has a special "stitching" feature to blend side-by-side scans together, getting it to work is no small feat; you have to scan *absolutely* straight and parallel for scans to match up. To help you do that, you can tape a straightedge to the table or spend $30 for a specially designed plastic guide (it should be included in the package, but it isn't).

Pressure-sensitive tablets

pressure sensitive tablets *(Jerry Clement/John Grimes)*

Pressure-sensitive tablets are designed for artists who want the greatest possible precision and variation in the lines they produce. As you move a stylus over the tablet surface, a duplicate (digitized) image appears on the computer screen.

As you press harder, the quality of the line changes (if the software accommodates this feature)—becoming thicker or darker, say. This lets you simulate pastels, calligraphic pens or other real-world artist's tools. (For some programs that work well with these tablets, see the reviews of Painter, Oasis and Studio/32 earlier in this chapter.)

Wacom tablet *(Jerry Clement/John Grimes)*

Wacom tablets ($700 to $4000 list) are the standard to which others are compared; if you spend a lot of time at the drawing board, they're well-worth their premium price.

Wacom tablets recognize 64 levels of pressure sensitivity, and have a nice, slight tooth to them. The stylus is powered by radio frequency instead of batteries or an electric cord, which makes it light and comfortable to use. It's so responsive that even a slight pressure produces the desired result.

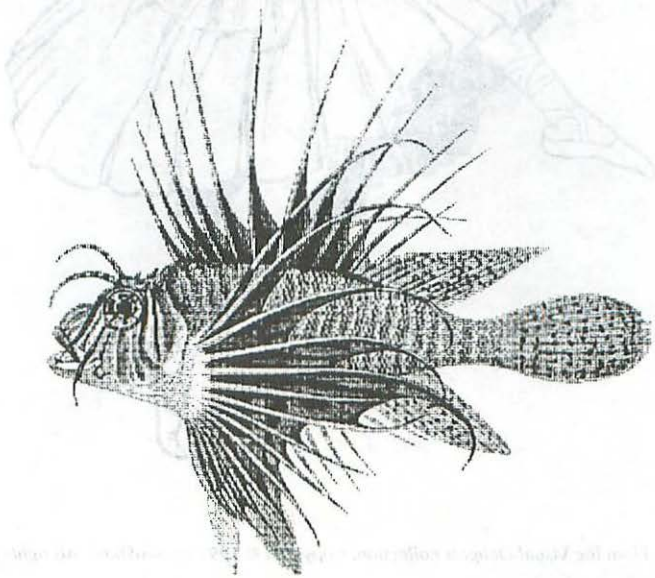
Wacom's tablets come as large as 18" x 25" (you can set the shape of the working area on your tablet to match the shape of your screen), but even the smallest tablet (6" x 9") doesn't feel constricting. Of course, if you're using a tablet for tracing, it has to be large enough to accommodate the original. One Wacom model comes with an electrostatic surface that secures the original artwork for tracing; this adds $100 to the price, but it's worth it.

CalComp tablet *(Jerry Clement)*

CalComp's DrawingBoard II tablets ($500 to $3150 list) perform almost as well as the Wacoms, but they differ in design. The stylus has internal batteries that make it feel top-heavy. A button at the lower end of the stylus functions like a mouse button, but I found its positioning a little awkward for my index finger.

As with Wacom tablets, you can set the tablet working area to match the shape of your screen, and you can switch between mouse and tablet modes (in mouse mode, the stylus acts as a mouse). Eighteen buttons let you assign macros created by programs like QuicKeys and Tempo. Instead of an electrostatic surface, CalComp uses a flexible plastic sheet to hold down artwork for tracing—it does the job very well.

CalComp really gives you a lot for the money. I like their tablets, but I wish they'd re-engineer the stylus. *[They're redesigning the stylus (and may have already finished by the time you read this). The balance may be better, but the new stylus will still contain batteries.—ND]*



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Chapter 14

Page layout

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Page layout programs

what is page layout? (ND)

mostly for beginners

Whenever people prepare ads, newsletters, books or anything else for printing, someone has to figure out the layout—where the text, graphics, tables, photographs, etc. go on the page. Before 1985—when PageMaker, the first page layout program, appeared—layout artists sketched a design by hand and then fitted type into it after it came back from the typesetter.

As the layout evolved, type might be reset repeatedly—sometimes at great expense. When the layout was finished, the columns of type were glued onto sheets of cardboard marked with the page dimensions—a laborious, time-consuming task.

very good feature

Page layout programs completely revolutionized this process. Now designers (and editors, or anyone who learns how to use the programs) can arrange and rearrange text and graphics on a computer screen with an ease and flexibility completely unknown just ten years ago.

Layout changes can be done much faster, more easily and less expensively by using a laser printer to produce proofs (or even final pages). No more gluing paper strips, no more messing with wax or rubber cement and T-squares.

page layout programs (HK)

Page layout programs tend to fall into one of two categories—high-end, suitable for commercial or other heavy use, and low-end, suitable for personal or light use. The two most popular high-end programs, PageMaker and QuarkXPress, are discussed in the next entry.

[Everyone calls QuarkXPress Quark, even though that's the name of the company and not the program. In fact, when

you launch the program, it says Quark *at the top of the screen, not* QuarkXPress.

"But where does the name Quark *come from?" you ask. Well, a* quark *is a kind of subatomic particle. (You probably knew that, but we're just getting started.) The physicist who christened quarks got the name from a line—"three quarks for Mr. Marks"—in James Joyce's impenetrable masterwork* Finnegan's Wake. *Joyce didn't make the word up—*quark *is German for a kind of cottage cheese (which Mr. Marks apparently loved). Ty Koontz can understand why; he had some quark in Germany and says it's more like Devonshire cream or crème fraîche than cottage cheese (but that may be a regional variation).*

So, tell me—when it comes to word origins, do we go the whole nine yards, or what? Now if we could only figure out where the name PageMaker *comes from.—AN]*

Two other high-end page layout programs are FrameMaker ($800; also reviewed below) and the Mac version of the popular PC program, Ventura Publisher (also $800). With its advanced word processing, drawing, equation formatting and table-building features, FrameMaker comes close to being an all-in-one publishing package. Ventura Publisher has many loyal users in the IBM world, and the Mac version has received respectable reviews, but it's not very popular on the Mac, because it's more complex and harder to use (or that's how it's perceived, in any case).

One final high-end program, ReadySetGo!, has a relatively low price. Sold as DesignStudio by its former publisher Letraset, ReadySetGo! fell behind PageMaker and Quark in the never-ending features race. Now its creator, Manhattan Graphics, is publishing it again; version 5 costs $400.

[I still use ReadySetGo! sometimes; it was so far ahead in the features race when it was last upgraded that it's only missing one important feature now—style sheets. Manhattan

Graphics is working on a major revision; in the meantime, version 5 is a great deal.—Hal Lewis]

Low-end page layout programs still offer lots of the most important features. Publish It! Easy has combined layout, word processing, painting and drawing tools, all in a fast, compact package; it only requires one meg of RAM and works well on a Plus, SE or Classic. Version 2.12 ($250 from TimeWorks) even incorporates a no-frills database, for publishing product catalogs, price lists and the like (version 3 is expected to cost $200). Unfortunately, Publish It! Easy!'s interface is clumsy.

Aldus' Personal Press ($300) is another good comprehensive program; it features predesigned layout templates for creating newsletters and other types of documents. These templates can be time-savers, and a great help if you don't have a designer's eye. Personal Press isn't as feature-rich as Publish It! Easy but its templates have everything you need for simple to moderately complex documents, and its interface is very smooth and easy-to-use. *[Remember that feature-rich ReadySetGo! doesn't cost much more than these low-end programs.—ND]*

Be aware that you don't need a layout program to do basic layouts, or even some fairly fancy ones. Most high-end word processors can do lots of tricks on a page, and you can use draw programs to do layouts too, if they don't run to too many pages.

PageMaker vs. Quark *(HK/ByB/AN)*

Both Aldus' PageMaker ($800) and QuarkXPress ($900) are competent and powerful page-layout programs, and each has taken turns surpassing the other as a version of one leapfrogs the previous version of the other. At this point in time, comparing Quark 3.1 to PageMaker 4.2, we much prefer Quark. Most people we know have gone over to Quark, as we have in preparing this edition.

Quark is much faster than PageMaker, and has more precise typographic control, better flexibility, superior graphic tools and more powerful color separation capabilities. PageMaker is easier to learn, however, and designers just making the transition to computer layout may prefer PageMaker's approach—you just place text or graphics directly on the page, without Quark's requirement that you first draw boxes to contain them.

Both programs use *master pages*—templates where you specify margins, headers and other elements that you want to appear on all pages. Unfortunately PageMaker limits you to two master pages per document—left and right. Quark documents can have more than 100 different master pages—a real boon for designers of books or other complex materials. For example, this book was laid out in Quark, and each section of each chapter had a separate master page, with its own running head on it. When we did the previous edition in PageMaker, we had to insert all the right-page headers by hand.

In addition to the drawing tools available in PageMaker, Quark has a polygon tool, a large library of borders for framing graphics or text boxes, and the ability to group objects together and lock them to a page. PageMaker limits you to seven line thicknesses (½, 1, 2, 4, 6, 8 and 12 points) while Quark gives you *thousands*. PageMaker will only rotate text in 90° increments (if you can call something as big as 90° an "increment") while Quark lets you rotate text *or* graphics by *thousandths* of a degree.

Quark also lets you drag elements from one page to another, one document to another, and in and out of storage libraries without using the Clipboard. You can even drag whole pages from one document to another document that's the same size or larger. You can't do these things in PageMaker because it *still* can't open more than one document (although the next version may fix that).

A lot of people feel that that's reason enough all by itself not to use PageMaker.

The designers of page layout programs assume that you'll be doing your text entry in a word processing program and then pour the finished document into a page layout program, but that's pretty unrealistic. There are always last-minute changes, and it's often simpler to create a short document from scratch in the page layout program where it's eventually going to end up. But creating and editing text in page layout programs can be painfully slow.

PageMaker gets around that with something called the Story Editor, a separate window into which you export your document so you can edit it quickly, as in a word processor. Text shows up in the Story Editor window in the correct type styles and with paragraph breaks, but paragraph formatting, page breaks, font and size information is dropped (until you export the document back into the layout view, that is). Going back and forth between the two views is easy and fast.

Quark doesn't have a story view, but editing in the layout view is faster than in PageMaker. Still, it's frustrating to do much editing in Quark on any Mac slower than an SE/30 or so, and if you want to add a whole lot of text without going batty, you really need something like an fx or Quadra.

Both programs have spelling checkers and find-and-replace, but PageMaker's hyphenation is better (because it uses a dictionary and not just algorithms). On the other hand, the special Aldus print drivers PageMaker requires are a pain. Unlike Apple's print drivers, they won't let you print in the background in System 7.

Only PageMaker can create tables of contents and indexes, but Quark doesn't need every specialized feature

because it's structured to accommodate add-on modules called XTensions, which are available both from Quark and third parties and are distributed by a company called XChange. One of their catalogs included 65 XTensions, including color managers, table editors, a hyphenation module for 20 different languages, a kerning-table editor, a utility that automates imposition and another that creates advertising dummies. Prices range from a few dollars to a few thousand.

A very useful XTension called Xstyle ($80 from Em Software, available from XChange) adds paragraph and character formatting palettes with handy items like left and right paragraph margins, first line indent, font name, type size, color, shading, horizontal scaling and baseline shift. Xstyle means you never have to open a dialog box to work with type now, and you can always see the specs of the text you're working on.

In response to Quark's XTensions, PageMaker has come up with Aldus Additions, but because they're macros rather than extensions of the program, they can only streamline use of PageMaker, not add features that aren't already there.

Quark lets you see the bottom of one page (or spread) and the top of the one below it—or several pages at a time—things you can't do in PageMaker. But it desperately needs a way to make a spread automatically fill the document window, the way PageMaker's ⌘W command does.

Another Quark annoyance is the way the window you edit your document in doesn't stay the size and shape you make it when you exit the program and then re-open the document.

Quark's technical support has improved to the level of PageMaker's. Both offer free telephone support for 90 days. After that, you can buy additional support from

Quark for $25 for 30 days or $200 a year, vs. $100/year for PageMaker (or $180/year for "premium," which also entitles you to a deeper discount on new versions of the program). Even if you don't buy either of these PageMaker support packages, you can get help by calling a 900 number and paying $15 per call—a great service for people who've learned the program but need occasional assistance.

To sum up: Quark 3.1's advantages over PageMaker 4.2 are quite substantial. Aldus will undoubtedly try to leapfrog ahead again with PageMaker 5 (or whatever the next version is called) but it's not going to be easy for them to do that.

learning Quark *(Lynn Broadwell)*

To learn Quark quickly, try the tutorials from Personal Training Systems (PTS). Each of the five (which are sold separately) contains a 90-minute audio cassette, a disk of lesson files, a command-summary card and a set of practice lessons. It's hands-on learning, and because it's audiovisual, it's much faster than learning from a manual.

If you know PageMaker, the beginning tutorial will be half enlightening and half (yawn) elementary, but the exercises gradually become more complex. *[That's what I hate about audiovisual tutorials. You have to proceed at whatever clunky pace the producer thinks is best, and you can't skip ahead, or use the index to find what you're interested in, the way you can with a book. (This is not self-interest speaking, by the way. If I thought videotapes worked, I'd produce them myself. And I'm not old-fashioned, either. It's just that books are a better tool, because they're so much easier to access randomly.)—AN]*

At $75 each, the tutorials cost a bit less than a class, and you can take a break when you need it, or start over if you make a mistake. *[For about a eighth of what these five tutorials cost, you can buy David Blatner and Keith*

Stimely's excellent (and best-selling) QuarkXPress Book ($28) *plus Blatner's and Eric Taub's* QuarkXPress Tips and Tricks *($22), both from Peachpit Press. You'll have all the information you need, in a much more accessible form, and $325 in your pocket.—AN]*

FrameMaker *(PH)*

If you produce long but relatively simple documents like manuals or in-house guides, you often need something more like an exalted word processor than a page layout program. FrameMaker fits the bill. At $800 it does a *lot* more than Word, but using it feels more like word processing than page layout.

FrameMaker has all of Word's features and most of Quark and PageMaker's layout capabilities, and it runs about as fast as PageMaker. The built-in word processor has an excellent spelling checker, extensive find-and-replace commands, automatic index and table of contents generation, footnotes, etc. FrameMaker has the best table handling of any Mac program I've seen, plus unique features like automated cross-references and conditional insertion (that is, *insert if...*, which lets you include or exclude certain text in different versions of a document).

Once you've learned the program, it's easy to use, and well-documented in a reference guide. The information's not organized well for *learning* the program, though; that's too bad, since I haven't found a good book on FrameMaker to recommend to beginners.

If you've struggled with long documents in Word, PageMaker, or Quark, you'll find FrameMaker a joy to use. For short documents and brochures, it works as well as PageMaker and Quark, but with fewer bells and whistles. *[And it's easy to exchange FrameMaker documents with people who use the program on NeXT or other Unix-based computers.—HK]*

Unfortunately, at this writing the Mac version has a few glitches, including a bad bug that crops up under System 7: the first time you copy or cut anything after you've started FrameMaker, the item vanishes—it never goes into the Clipboard. After that first attempt, everything works fine. *[Still, I'd call that a fairly major bug.—AN]* Amazingly, the publisher (Frame Technology) doesn't plan to fix this until version 4 (the Unix versions of the program get the lion's share of their attention).

Basic design tips

rule #1—break the rules *(AN)*

Many professional designers would love to have you think that there's a right way and a wrong way to design something. That idea is not merely incorrect—it's absurd. Designs can't be right or wrong; they can only be better or worse. It's a subjective matter—although that certainly doesn't mean everybody's opinion is equally worth listening to.

The tips in the next entry (and in the books described at the end of this entry) are all good, sensible, basic guidelines to good design. But good design is, by definition, not boring (unless you think boredom is good). And yet it's easy to follow all those design rules and come up with something that makes phenobarbital seem like a stimulant.

If I had to come up with a design rule, it would be: *Never use Times or Helvetica for anything.* I think it's at least as universal as any of the others you're about to read. But let me give you a more general rule—*fais ce que voudras* (as my old buddy Frankie Rabelais used to say): *Do what you want.*

rule #2—follow the rules *(Rich Wolfson)*

If you don't have much of a design eye—and you *realize* that you don't—follow the rules. Times and Helvetica are

eminently readable *[Nonsense. Helvetica is virtually unreadable as body text.—AN]* and have stood the test of time—they didn't become standards by accident. *[They became standards because most designers—and their clients—are afraid of their own shadows.—AN]* Using Times for body text and Helvetica for headlines is a safe, good-looking way to go *[Well, it's safe.—AN];* their very unobtrusiveness lets the message get through. *[And the message is:* I'm boring. Don't read me.*—AN]*

some basic design guidelines *(C.J. Weigand)*

Here are a few general design guidelines I've found useful.

- Mixing more than three typefaces or styles on a page is something a professional designer will do only very rarely.
- Use color to set your publications apart from others. Don't be gaudy. Spot color tastefully applied might be all you need to catch a reader's eye. In a market where color predominates, the absence of color can also be used to good effect.

- Leave plenty of white space to balance your compositions. A cluttered page is likely to be overlooked as being too "busy" to spend time with.

- Organize your message around a dominant visual element. A single large headline or graphic can help to focus your readers' attention; several will probably confuse them.
- Use subheads to break up your text and sustain interest. You can also separate large blocks of text by using well-placed pull quotes. Set them in a different font or type style from the main text.
- Additional emphasis can be given to text and graphics by accenting them with boxes or frames. Drop caps can further heighten interest, but should be used sparingly.

- Design facing pages together. Two pages that look great separately can clash terribly when placed next to each other.

- Above all, be consistent. Consistency lends credibility to your message.

✎ three good basic design books *(SS/SA/AN)*

Thanks to desktop publishing software, millions of people now have the tools to create gaudy, unbalanced publications full of klutzy layouts and mismatched fonts. Just as easy-to-use financial software won't instantly make you a CPA, accessible desktop publishing tools won't magically give you taste. Fortunately, Ventana Press has published three good books to help the design-illiterate.

Roger C. Parker's *Looking Good in Print* ($24) does a good job of covering design essentials, offers help in selecting typefaces and provides hints for effective use of the tools of the trade. Lots of graphics makes it a quick read.

Another Parker offering, *The Makeover Book* ($18), is subtitled *101 Design Solutions for Desktop Publishing.* It's divided into sections—brochures and fliers, advertisements, business correspondence, etc.—each of which contains general guidelines and lots of before-and-after layouts. Get this book even if you can lay out a good page—it will teach you to lay out a better one.

A very nice guide to *Designing in Black & White on Your Computer* (as its subtitle puts it), *The Gray Book's* 208 pages are crammed with clear, detailed and relatively sophisticated discussions of contrast, lighting, shading, scanning and many other important topics, and contain lots of terrific illustrations as well. It costs $23.

✎ desktop publishing periodicals *(AN/SA/Jim Norrena/ND)*

If you're involved in any sort of desktop publishing, there are some periodicals you should know about. (Most of them cover both Mac and PC systems, but you'll find them useful in spite of that.)

Publish!, the pre-eminent magazine in this field, is packed with terrific information. A monthly, it costs $40 a year. *Verbum* is a slick quarterly ($24/year) that bills itself as a *Journal of Personal Computer Aesthetics;* it's the most arty of these magazines.

The Page is a handsome newsletter ($65 for 10 issues/year) from Chicago that's full of useful, practical tips you often don't find elsewhere. *Step-by-Step Electronic Design* wasa beautifully designed, full-color newsletter, packed with great info and tips. Unfortunately, it's now defunct.

Business for Publishing is a monthly out of Chicago that does a good job of covering the field; it's distributed free to people who say they have the right combination of equipment and responsibilities on the subscription form. *The Weigand Report* (now published by Doucette's Desktop Publishing) contains a lot of good information, but it's relatively expensive, at $65 for ten six-page issues a year.

Bove & Rhodes Inside Report On Desktop Publishing and Multimedia is written by Tony Bove and Cheryl Rhodes, two of the most knowledgeable people in the field. Published monthly, it gives you a level of in-depth analysis that's hard to find elsewhere. It's more technical (and more expensive—$245/year) than any of the periodicals mentioned above, and is aimed at more sophisticated readers.

read the world *(HK)*

You can learn a lot about good design simply by paying attention to what you see in magazines, books, billboards, product packaging and so on. There's a world of great design out there—don't be afraid to borrow the ideas you find appealing. *[Assuming you can. It's one thing to like something, but it's another thing altogether to reproduce it, and it's even harder to vary it and still maintain the look.—AN]*

color-matching *(Stephen Herron/CS/AN)*

Computer monitors create colors by shooting an electron beam at tiny red, green and blue dots that are painted in a precise pattern on the inside of the screen. (The dots are phosphorescent, and glow when the beam hits them.)

When the red, green and blue are combined in equal amounts, the resulting color is white. Since the picture on the monitor is made by adding the light from thousands of dots, it's a kind of *additive color* (called *RGB*, after the colors of the dots).

When you *print* colors, you start with white paper, which reflects all the colors present in white light. When ink covers the paper, it subtracts some light by absorbing it. Thus printing is an example of *subtractive color.*

Most color printing uses four *process* colors: cyan (a kind of blue), magenta (a purplish red), yellow and black. (Theoretically, cyan, magenta and yellow, when mixed in equal amounts, will produce black, but the image is a lot sharper when you add actual black ink.)

Just as monitors use closely spaced red, green and blue (RGB) dots to produce colors on screen, printers use closely spaced dots of the four process colors (which are abbreviated CMYK) to produce colors. The problem of *color-matching* is making the RGB additive color you see on the screen match the CMYK subtractive color you get on paper.

So far, three programs—Photoshop ($900), Fractal ColorStudio ($800) and Cachet ($600)—effectively simulate CMYK colors on a monitor, by restricting the screen's RGB range, so that only printable colors are displayed. Not every color can be matched—monitors are better at pastels, and printing is better at blacks and very dark colors.

Making the RGB on a monitor match the CMYK on paper is called *calibrating* the monitor. This is often accomplished with the help of another color system used in printing—*PMS* (for *Pantone Matching System).* Unlike RGB and process colors, PMS colors aren't made up of little dots; they're all one color, like house paint.

A PMS book consists of thousands of little color samples—like paint chips—with numbers that identify each one. *[Using a PMS number is the safest way to tell a printer what color you want.—ND]*

PMS colors can be approximated in both RGB and CMYK colors, and thus give the monitor a standard to shoot for (thousands of standards, actually). You can also perform a rough calibration with a decent-quality color printout of an image from your Mac. Adjust the white on the monitor to match the color of your output paper, then hold the printout next to the image on the monitor and tweak the color wheel until the two seem to match.

General page layout tips

❦ seeing what you're moving *(SA/AN/ByB)*

When you drag something in PageMaker or Quark, what moves is an *outline* of the item; when you stop dragging, the item itself appears in the new position. But when you're trying to align something exactly (to a guide, say), the outline isn't good enough. So hold the mouse button down before dragging.

When PageMaker's pointer changes from an arrow to a cross with arrows at the end of each arm (how long that takes depends on how complex whatever you're dragging is), the Mac has loaded the object into memory and will show it to you in detail when you drag. When Quark's *item tool* (the four-directional arrow that's used for moving objects) turns into a clock, the object will be visible when it's dragged.

the grabber hand (SA/ByB)

You don't have to use the scroll bars to view different parts of the page you're on—there's a grabber hand you can use to slide the layout around in the window. In both PageMaker and Quark 3.1 (or with the FeaturesPlus XTension in Quark 3.0), you hold down Option and press (and hold) the mouse button. In Quark the hand appears as soon as Option is pressed, but in Pagemaker it only appears after the button is pressed.

selecting layered objects (ByB)

When you have elements lying on top of one another in PageMaker, a ⌘-click will get you beneath the one on the top (it selects the next one down). To get the *next* item down, ⌘-click again. And so on. In Quark 3.1, a Shift Option ⌘-click does the same thing. (Once a buried item is selected, you can bring it the top of the pile permanently with the *Bring to Front* command.)

dragging objects, not guides (AN/ByB)

In PageMaker, it's sometimes hard to drag something when a guide is right next to it (or, even worse, right on it); everytime you drag, the guide moves, not the object. To avoid this continuing annoyance, go to *Preferences...* on the Edit menu and click the *Guides: Back* button. Then PageMaker will always assume you want to drag an object rather than a guide (to drag a guide, go out to where there are no objects near it and grab it there).

When Quark's pointer is over a box, it will ignore guide lines. To select a guide line in that situation, holding down ⌘ will let you drag the guide instead of the box.

masking (AN/ByB)

Every PageMaker expert I know uses *masking*, but many beginning users don't know about it. It couldn't be simpler—when there's something on the page that you

don't want, it's often easier to cover it up than to try to remove it. To do that, you draw a rectangle (or some other shape, but rectangles usually work best) and place it over what you want to erase. Then go to the Element menu and select *Paper* under *Fill* and *None* under *Line*. The rectangle disappears, and so does what's behind it.

This same technique also works in Quark. Boxes are frameless by default—you just have to make sure the background in the box specifications is either Black (0% shade), White or Registration. Either text or graphic boxes can be used to mask.

copying tabs and indents *(Jerry Szubin/SA/ByB)*

To copy tabs and indents from the first paragraph in a selection to all the other paragraphs in PageMaker, select all the text and choose *Indents/tabs* from the Text menu. The tabs and indents in the first paragraph will be displayed in the dialog box. Now just click *OK* (don't do anything else). These settings will be applied to all the selected paragraphs.

To copy tabs and indents from one paragraph to paragraphs that *don't* follow it, copy part of the original paragraph and paste it at the top of the paragraphs you want to change. Select all the paragraphs, use the *Indents/tabs* trick and then delete the pasted paragraph (or piece of a paragraph).

In Quark, you can only copy tabs in this way by choosing *Tabs...* from the Style menu. However, you can easily copy all of a paragraph's formatting whether the paragraphs are adjacent or not.

Place the insertion point in the paragraph you want to reformat, put the I-beam pointer over the paragraph with the desired formatting and Shift Option-click. This will only work between paragraphs in the same story; it doesn't change any character formatting.

changing point sizes *(SA/ByB)*

In both Quark and Pagemaker, you can make selected text bigger in one-point increments by pressing Shift Option ⌘ . ; pressing Shift Option ⌘ . will make it smaller. Eliminate the Option key and the size change will jump to the next one shown on the menu, rather than moving in one-point increments. (These commands make sense when you realize the other characters on those keys are the *less than* (<) and *greater than* (>) symbols.) Note that the public domain utility Period-Comma (which lets you type periods and commas even when the Caps Lock key is down) keeps the one-point-size-at-a-time option from working.

delaying text rewrap *(SA/ByB)*

As soon as you change a border on a graphic, text is automatically rewrapped around the new shape. If you're making several adjustments, waiting for constant rewraps can be annoying. In both PageMaker and Quark, you can delay the text rewrap until you're finished futzing, by holding down the Spacebar while you drag the borders.

spreading a list without tabbing *(ByB)*

The *Force justify* alignment command in PageMaker lets you spread text out to fill a line. If there's just one word on the line, it puts spaces between letters; if there's more than one word, it puts spaces between the words.

This feature has a valuable side effect. In certain lists, you may want items flush left to one side of the column (or to one margin) and other items flush right to the other side, so that they'll look like this:

Hamlet	Richard Chamberlain
Ophelia	Sissy Spacek
Claudius	Sting

You can set this up with a right tab at the right margin and tabs between the items, but *Force justify* provides a quick alternative, without any tabbing.

There's only thing you need to remember: If there are two or more words on either end of the split, put a fixed space (Option Spacebar) between them. That way they won't be spread, and all the space will be put in the middle of the line.

very good feature

Quark 3.1 has an even simpler method of spreading a list. At any point in a line you can type Option Tab and all the following text will be pushed to the right margin.

PageMaker tips

sticky page numbers (AN)

mostly for beginners

Although I'm very much in favor of all Mac programs following the standard Mac interface, I like something PageMaker does that no other program I know of imitates. It remembers how many copies and what pages you wanted to print from the last time and gives you those numbers as defaults in the Print dialog box. (Other Mac programs reset the page number range to *All* and the number of copies to *1.)*

These "sticky page numbers" take a little getting used to, but I think they should be the norm for Mac programs (in which case they wouldn't take any getting used to). It's much easier just to click on *All* when that's the page range you want than to have to repeatedly type in two page numbers—as you would, say, if you were futzing with pages 626 to 629 of a document, trying to get them right. With sticky page numbers, you just hit ⇧⌘P and Return and the page range you specified last time prints out.

shrinking PageMaker files (SA/AN)

mostly for beginners

PageMaker files get bigger as you work on them. That's because the program *appends* changes to the existing file when you save, rather than replacing it with the new, edited one. You can often cut the size of a PageMaker file in half (or more) by choosing *Save As...* instead of *Save.* When

you *Save As...* with the same filename, the old file is completed replaced by the current one, and all the appended changes are thrown away.

viewing the whole pasteboard *(C.J. Weigand/SA/AN)*

If you hold down Shift as you choose *Fit in Window*, you'll get a view that includes the entire pasteboard. This makes it easy to drag graphics and text in off the pasteboard and onto your page. (The changed command doesn't show up in the menu when you hold down Shift, but it still works.)

Send to Back and deselecting *(AN)*

When you send an object to the back, PageMaker should deselect it. But, annoyingly, you have to click somewhere else to do that. (After all, why would you ever want to send something to the back and keep it selected? Even if you can think of a few bizarre examples, what would you *normally* want to do?)

[In order to resize it to fit with other objects, that's why. For me, it's quite common, hardly bizarre.—ByB]

page-turning shortcuts *(SA/SM)*

The number of page icons that appear at the bottom of your window depends on the size of the window (and therefore on the size of your screen). When there are more pages than there's room for icons, scroll arrows appear at either end of the page icons.

Shift-clicking on either scroll arrow moves the icons by groups of six. ⌘-clicking on the left scroll arrow displays the icon for the first page of the document; ⌘-clicking on the right scroll arrow displays the icon for the last page.

⌘Tab moves you to the next page or spread and Shift⌘Tab to the previous page or spread. These commands work even when you have the horizontal scroll bars turned

off (which makes the little page icons at the bottom of the screen disappear).

When you return to a page, it's displayed in the same view and position as you left it. If you want to see it in *Fit in Window* view no matter how you left it, hold Shift while you click on the page icon.

slide shows (SA)

To see a "slide show" of your document, hold Shift while you choose *Go To Page*. PageMaker will display each page (or spread if you're viewing facing pages) on the screen for about four seconds. To stop the show, just click anywhere with the mouse. To speed it up a bit, turn off the Rulers first—time won't be wasted redrawing them every time a new page is displayed.

kerning (AN)

To *kern* a pair of characters (i.e. bring them closer together), use Option Delete. To move them farther apart, use Option Shift Delete. In both cases, the characters move by 100ths of an em. Since an em is the same number of points wide as the font you're using is high, these commands will move 24-point type about a quarter of a point, 12-point type about an eighth of a point, etc.

These commands are particularly useful when you have a paragraph with a single word on its last line. On a page where the text is running long, select the paragraph, hit Option Delete once or twice and the word will pop up to the line above. On a page where the text is running short, use Option Shift Delete instead, and other words will flow down to the last line, making it more attractive.

In general, using either of these commands more than once or twice on a paragraph of text will make it look too tight or too loose. You can also use ⌘ Delete and ⌘ Shift Delete to kern letters by 25ths of an em, but that's an awfully coarse amount for text (it might be useful for headlines).

You can cancel all kerning in a selected block of text by hitting Option ⌘ K.

some useful keyboard shortcuts *(AN/SM)*

Here are a few of the more useful PageMaker shortcuts:

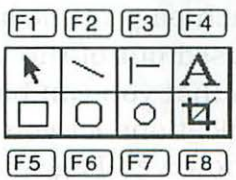
triple-click *(with I-beam pointer)*	select paragraph
Option ⌘ P *(with I-beam pointer)*	insert automatic page number
Shift *(while dragging on graphic handle)*	resize proportionately (rather than stretching)

keyboard tool shortcuts *(SA/SM/KF)*

In PageMaker 4, you can toggle between any tool and the arrow pointer by pressing ⌘ Spacebar. Avoid holding the two keys down; if you do, you'll get a strobe effect between the two pointers with no way to tell where you'll end up. And if you're going from the text tool to the pointer, make sure you don't hit the Spacebar before you have ⌘ held down or you'll add a space where you may not want it (or worse, lose selected text).

If you have an extended keyboard, you can select any of PageMaker's tools by using Shift and the function keys (these commands work even when the tool palette's closed):

Hit Shift plus the function key to select a tool



centering objects on each other *(AN)*

PageMaker desperately needs, but doesn't have, a command for aligning objects to one another (the way most draw programs do). Aligning the edges is easy—you just pull a guide to the edge of one and drag the other

objects to it. But centering them is trickier. Here's how to do it:

When you select a text block, a graphic or a drawing in PageMaker, eight selection handles appear on it—one in each corner and one in the middle (aha!) of each side. Just pull a guide to that middle handle and then align the middle handles of the other objects to that same guide. (This trick won't work with lines, since they only have two selection rectangles, one at either end.)

customized thumbnails *(SA/KF/AN)*

You can print out pages in miniature with the *Scaling* option in the Print dialog box, but that only gives you one miniature page per sheet of paper. Or you can choose the *Thumbnails* option and get as many miniature pages per sheet of paper as you specify. But to miniaturize just the specific pages you want, to just the size you want, and to be able to insert them into other PageMaker documents, click the PostScript button in the Print dialog box. Save the pages as EPS files. Then you can use the *Place* command to put the EPS files of your pages back into any PageMaker document and make them any size you want.

how PageMaker handles fonts *(AN)*

After PageMaker prints a block of text (in other words, by the end of each page at the latest), it's supposed to flush the fonts it used out of the laser printer's memory. This *should* mean that you can have as many fonts in a block as most applications let you have in a whole document. In practice, however, PageMaker doesn't seem to be able to handle more fonts than other programs, and it doesn't seem to flush them out at the end of each text block either.

When I printed out the outline font sampler in the last edition, the printout was interrupted each time by messages saying that the printer had no more room for fonts. But all I had to do was start printing again at the

page after the last one to come out of the printer, and everything would be fine. (It usually took me three print commands to get the whole chapter.) The implication is that there were residual fonts (or residual something) in the printer after a text block was finished, but that weren't there when I gave the print command again. This isn't how it's supposed to work.

Another problem with PageMaker's approach to fonts is that it slows down printing, since the fonts have to be downloaded to the printer anew at the start of each block. One way around that is to manually download all the fonts you commonly use before you start the job. That's worth the trouble if you're printing a fair number of pages and/or documents in which the same fonts (or many of the same fonts) will be used.

Styles *(SA)*

When you apply a style to a paragraph, its font and size are automatically applied to the entire paragraph—even if you have some characters in it that are formatted differently (like Return and ⌘ in this paragraph). To preserve the special font and size formatting, Shift-click instead of clicking.

When a name in the Style palette is followed by an asterisk, it means the style was imported from a word processing document. When the name is followed by a plus sign, it means the selected paragraph was defined as that style and then "overrides" were applied (additional formatting beyond the style definition—like tabs, say). A style can, of course, have both an asterisk and a plus sign after its name.

You can go directly to the Edit Style dialog box by ⌘-clicking on the Style's name in the Style palette.

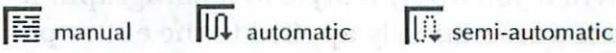
special spaces *(SA)*

PageMaker lets you use four special kinds of nonbreaking spaces that "glue" words together so they won't be split

at the end of a line. The *em* space (Shift⌘M) is as wide as the point size you're using. The *en* space (Shift⌘N) is half the point size. The *thin* space (Shift⌘T) is one-quarter the point size. The *fixed* space (Option Spacebar) is the size of a normal space in the font and size you're using.

semi-automatic flow *(SA/Arnie Burgener)*

When Autoflow is checked (on the Options menu), a click starts the text flowing onto as many pages as necessary. When Autoflow isn't checked (*manual* flow), the text stops at the bottom of the page or column. But you can also have *semi-automatic* flow, where the text stops at the bottom of the page or column, but the pointer remains loaded with text, instead of turning into the selection arrow. To get semi-automatic flowing, hold down Shift when the pointer is loaded with text, no matter which mode you're in. Here's how the three pointers look:

Text flow icons 

By the way, you can stop an Autoflow operation at any time by just clicking the mouse button. This doesn't undo the operation, however—whatever's already flowed into the document stays there.

deleting a linked text block *(SA/AN)*

If you have a "story" (i.e. text) running through multiple text blocks and you want to remove the middle text block without losing any of the story, *don't* select the middle text block and delete it—all its contents will be lost, and while the first text block will then be linked to the third, all the material in between will be missing.

Instead, close the middle text block by dragging its bottom border all the way up to the top border (or vice versa), so that the two of them together make a single line on the screen. Click anywhere on the screen and the line will

disappear. Your first block will be automatically linked to the third (which will now be the second), with no text lost.

rewriting the screen (JK)

Sometimes when you move or resize objects on a page, they end up looking like they have chunks missing or are distorted. To fix this problem, use any of the size commands at the top of the Page menu (or their keyboard equivalents). These commands make PageMaker redraw the screen, even if it was already showing the page at that size. If objects still look wrong after the screen redraws, make sure they're not overlapping objects in another layer.

Quark tips

David Blatner and Keith Stimely's tips in this section are adapted from their QuarkXPress Book.

fast moves (ByB)

To drag a text or picture box without having to switch from the content tool to the item tool, hold down the ⌘ key. However, you don't have to select the box first. Simply ⌘-click and drag and the box will move immediately.

pushing buttons (David Blatner/Keith Stimely)

Almost every button in Quark's dialog boxes can be selected with a keyboard combination—usually ⌘ plus the first letter of the button's name. For example, if a dialog box has *Yes* and *No* buttons, you can select them by typing ⌘Y and ⌘N. Press ⌘. to select *Cancel* in any dialog box.

Quark keyboard shortcuts (ByB)

triple-click	selects line
quadruple-click	selects paragraph
quintuple-click	selects whole text block

Control-click	zooms in by 25% (or amount you define)
Option Control-click	zooms out by 25% (or amount you define)
Control-click drag area	zooms to fill screen with area selected

palettes by keyboard *(David Blatner/Keith Stimely)*

You can also select items on the Tool or Measurements palettes with keyboard commands. To select the next tool down on the palette, hit ⌘Tab. To select the next tool up, type ⌘ShiftTab. If the Tool palette is closed, either command opens it. ⌘OptionM opens the Measurements palette (if it was closed) and selects the first item.

style sheets shortcuts *(David Blatner/Keith Stimely/ByB)*

Quark 3.1's Style palette makes choosing styles easy, but it's even more efficient to assign them keyboard shortcuts. As you define a style in Quark's Style Sheet dialog box, enter a key sequence in the *Keyboard Equivalent* box. Remember, though, that for styles you can use only the function keys (F1 through F15) on an extended keyboard or the numbers on the numeric keypad (although the latter can be used in conjunction with Shift, Option, Control or ⌘).

(One advantage of using the Style palette over keyboard shortcuts is that you can force an applied style to wipe out all local formatting and apply only the new style, by holding down Option when you click on the style in the palette. This is the equivalent of turning the paragraph to *No Style* and then applying the new style.)

special characters in Quark *(ByB)*

Quark has lots of special characters especially for layout and typesetting purposes. Here are a few I use often:

- ⌘Spacebar is a nonbreaking space, useful for preventing two words from being separated with a line break or for forcing a word to the following line.

- [⇧⌘][=] is a nonbreaking hyphen, useful for preventing a hyphenated word (name, phone number) from being separated with a line break.
- [Shift][Return] is a *soft return;* it makes a line break without starting a new paragraph.
- [⇧⌘][Return] is a discretionary return, similar to [⇧⌘][-], the discretionary hyphen. If Quark needs to break the word at the end of a line, it will do it where you insert the discretionary return, but will neither put in a hyphen nor make a new paragraph. This is useful for allowing a break after a slash in a compound word.
- [⇧⌘][\] is an "indent-here" character. It lets you create an instant hanging indent for a single paragraph without having to deal with margins and first-line indents. Wherever you insert the invisible character [⇧⌘][\], all following lines in the paragraph will indent to that point.

very good feature

unchaining a text box *(David Blatner/Keith Stimely)*

very hot tip

If you unlink a text box from the middle of a chain by clicking on the arrowhead or tailfeathers with the Unlinking tool, you break the entire text chain at that point. To remove a text box without breaking the flow, select the Unlinking tool, hold down the [Shift] key and click the box you want to remove.

DA text entry *(David Blatner/Keith Stimely)*

Because text entry goes slowly in page layout programs, you generally add long passages to Quark documents by importing text from a word processor. If you'd rather not open a word processor while you're doing layout, you can use a simple text-entry desk accessory and then paste the text in your page. The text you create in a DA will be only plain text, but you can change the font and style after it's in Quark.

reverse type *(David Blatner/Keith Stimely)*

Unlike PageMaker, Quark has no command for reversed type (white type on a black background). But you can

achieve that effect by setting the text's color to white and then placing a black box behind it (or coloring the text box's background in the Text Box Specifications dialog box).

style for reversed heads *(ByB)*

Quark allows you to define a paragraph style which automatically creates a black bar with the text reversed out of it, like the main section heads in this book.

First put the insertion point in the appropriate paragraph, select *Rules...* from the Style menu and click on *Rule Above*. Then choose a width several points greater than the point size of the type (for instance, our section heads are 18-pt and the rule is 25-pt). Then set the offset to a negative number a little less than a third of the rule width (ours is minus 7 points). Then click *OK*.

Now select the text in the paragraph (presumably less than one line) and choose *White* under *Color* in the Style menu. This will give you reversed out text on a black bar, but the text will begin right at the left edge of the bar. To fix this, you can either center the text, space it over manually or use the *First Line* setting in the Formats dialog box to indent the text from the left margin.

If you want this to be a defined style, you can now select *Style Sheets...* from the Edit menu and click *New*. The new untitled style will have the rule, type and format settings you've just defined. Name the style and you can apply it to other headings.

vanishing elements *(David Blatner/Keith Stimely)*

When you select a text or picture box, any page elements that overlap that box are hidden. This lets you edit the contents of a box free from any distractions, but the sudden disappearance of parts of a page can panic even experienced users. Of course these "vanished" elements aren't really lost; you can quickly bring them back into view by clicking outside the page to deselect the box.

larger, faster thumbnails *(David Blatner/Keith Stimely)*

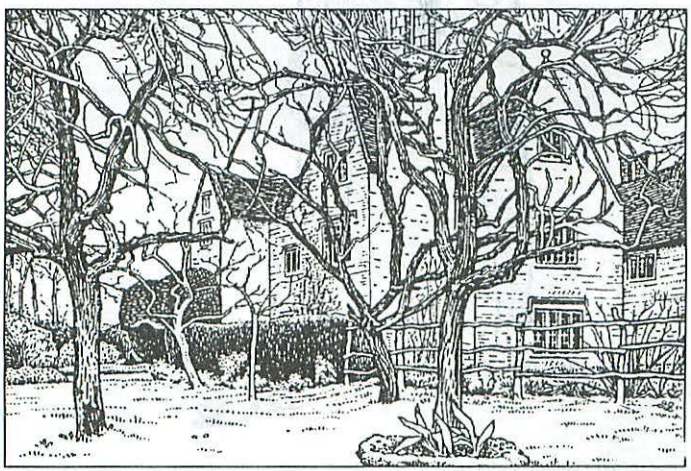
At eight to a page, Quark's thumbnails are tiny. We find them much more useful at twice that size (just enter *200%* after *Reduce or Enlarge* in the Page Setup dialog box). To print them out faster, check *Rough* in the Print dialog box (they'll have simplified frames and X's through the pictures).

curly quote conversion problems *(ByB)*

Quark has an option that converts straight quotes to curly quotes when you import text. But it's not very smart about it. There are at least three instances that don't convert properly:

- All inch marks become close quote marks (").
- Abbreviated years like '92 turn into ‘92 (because Quark thinks the number is a word being quoted).
- Anytime a closing punctuation mark (like a period, comma, semicolon, colon, question mark, exclamation mark or em-dash) directly precedes an open quote, Quark converts it to a close quote. For example, —*"The MacBible...* becomes —*"The MacBible....*

To catch those wrong-headed conversions, you have to search through the file for close quotes after importing it (or, if the text you're pouring has been carefully prepared, just turn this option off).



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Chapter 15

Sound and action

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Sound on the Mac

the Mac's built-in sound *(JK/Craig O'Donnell)*

Unlike most other computers, the Mac was designed with the ability to play back sounds over its built-in speaker. You can choose any of several sounds to be used as the Mac's system alert, and some Macs have built-in recording capability (see the entry called *Sound settings* in Chapter 4).

There are also plenty of colorful, bizarre and silly sounds available from user groups, electronic bulletin boards and on-line information services, as well as in commercial packages like the two-volume Star Trek Collection from Sound Source Unlimited ($50 list per volume).

Sounds come in various formats, the most convenient of which is System 7's resource format (it lets you copy sounds directly into System 7's System file, and when you double-click their icons, the Mac plays them over the speaker). In System 6, you have to install sounds with a utility like Sound Mover, described below.

digital sound *(JK/Craig O'Donnell)*

The Mac records and stores sound digitally. Digital recording is like making a movie, but instead of taking a series of photos that become frames in a moving picture, you're taking *samples* (audio snapshots) of a sound wave at regular intervals and translating them into numbers for storage on the computer. When you play them back at the same rate, they reproduce the original sound.

The number of samples taken per second is called the *sampling rate;* the higher the sampling rate, the greater the accuracy of the recording, and the better it'll sound when played back. (Recordings made in this way are often called *samples* too.)

The Mac's built-in 8-bit sound can record or play back up to 22,254 samples per second (usually abbreviated as 22 kHz), which yields sound quality comparable to an AM radio. A Mac with a 16-bit audio card installed can handle sampling at up to 44 kHz, which preserves the live sound's pitch and dynamic range (loudness) much better and virtually eliminates distortion, producing CD-quality recordings.

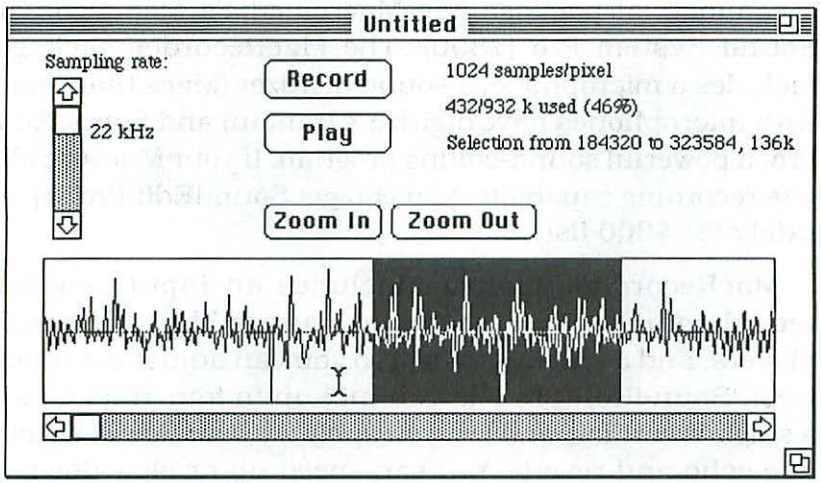
(To avoid distortion, the sampling rate must be twice the audio frequency being recorded; since the highest pitch that human ears can hear is about 20 kHz, a 44 kHz sampling rate eliminates high-end distortion within our hearing range. The 22 kHz rate is likely to distort frequencies starting about 11 kHz, which is five octaves above middle C.)

shareware sound utilities *(JK/Craig O'Donnell)*

Several shareware utilities are available that expand what you can do with 8-bit sounds. SoundMaster ($15) and SndControl ($20) allow you to assign different sounds to different events (one sound when you empty the Trash and another when you insert a disk, for example).

Wavicle ($20) and Sample Editor (freeware) allow you to record sounds longer than ten seconds (how much longer depends on how large you set the application's allotted memory in the Get Info dialog box). You can also edit sounds (with Cut and Paste commands, as you would with text or graphics) and apply effects like reverb and fade-out to them.

When you open a recorded sound with these programs, a graphic representing its sound wave appears (it's similar to what you see on oscilloscopes or EKG monitors). You can select any part of the sound by dragging the pointer over the wave (Wavicle's pointer turns into an I-beam, as in the illustration at the top of the next page). Then you can play just that section, apply special effects to it, or cut or copy it.



Sound Mover and SoundExtractor also provide basic editing and can convert sound files in various formats into System 7 resource files. Sound Mover can also install alert sounds in System 6.

tracks and channels (JK)

mostly for beginners

The same terms used in non-computer recording often apply to recording on the Mac. Here are a couple you should know.

When several separate recordings are combined into one composite recording, each individual recording is called a *track*. For example, you might record each instrument on a separate track, and then combine the tracks together for the final recording.

A *channel* is a pathway for sound, either in recording or playback. For example, if you make a recording using several microphones, each will have its own channel, although their sound may be combined onto a single track. Similarly, stereo recordings play back over two channels, one for each speaker.

8-bit sound recording (JK/Craig O'Donnell)

For Macs that don't come with built-in recording capability, and for producing multitrack recordings, you need

a commercial package like Macromedia's MacRecorder Sound System Pro ($350). The MacRecorder package includes a microphone, a sound digitizer (Macs that come with microphones have digitizers built in) and SoundEdit Pro, a powerful sound-editing program. If your Mac already has recording capability, you can get SoundEdit Pro separately for $300 list.

MacRecorder's digitizer includes an input jack for recording from other electronic sources like tape or CD players, and a volume control so you can adjust the input level. SoundEdit Pro lets you mix up to four tracks into a single recording, and lets you apply a whole slew of effects like echo and reverb. You can speed up or slow down a sound without changing its pitch, or change the pitch without speeding up or slowing down the sound.

Because it records directly to disk instead of to RAM, SoundEdit Pro can record much longer sounds than the applications in the previous entry, which are limited by the Mac's available RAM. Its various features enable you to put together elaborate soundtracks for presentations in programs like Director, HyperCard or SuperCard.

SoundEdit Pro requires a Mac with a 68020 chip or better, but it comes with an earlier version, SoundEdit 2.0.5, that can work on 68000 Macs like the Plus, SE, Portable, Classic and PowerBook 100.

If you don't need editing ability, Articulate Systems' Voice Impact provides a digitizer and microphone for quite a bit less than the MacRecorder package ($100). The more expensive Voice Impact Pro ($230) comes with editing software, but it's not worth the extra money.

a better microphone *(Craig O'Donnell)*

You can improve the quality of your recordings by substituting Radio Shack's $50 PZM microphone for the ones that come with Macs, MacRecorder or Voice Impact.

16-bit sound recording *(JK/Craig O'Donnell)*

CD-quality, 16-bit recording on the Mac is similar to 8-bit recording; you just need more powerful—and more expensive—equipment. (You can also use 16-bit equipment to create higher-quality 8-bit recordings than you'd get from the packages described above.)

An 8-bit recording takes up about 1.2 megs of memory per minute, but a 16-bit recording takes up about 4.8 megs a minute. With this in mind, 16-bit recording systems record directly to your Mac's hard disk rather than to its memory. So you need a large, fast hard disk—many musicians use drives that hold upwards of 200MB (most drives this size are fast enough).

As of this writing, Digidesign is the only manufacturer of 16-bit audio cards for the Mac. By the time you read this, they'll have released Audiomedia II ($1300), an improved version of their basic digital recording package. It includes one stereo NuBus card and SoundDesigner II, the same industry-standard editing software that comes with their high-end audio package, Sound Tools II.

In addition to its RCA-type input jacks (the kind used on home stereos) the Audiomedia II card has connectors for digital input and output. By connecting a DAT (digital audio tape) recorder to the digital output connector, you can copy a finished recording to DAT and use it as a master to press CDs from.

For home studio recording and mixing, Digidesign offers Deck ($350), the software equivalent of a four-track tape deck (only better, because it does more). Deck handles *panning* (the positioning of a sound between left and right speakers) and *bouncing* (mixing multiple tracks down to one or two tracks and then recording new tracks on the freed-up channels). Deck will also synchronize digital audio tracks with MIDI tracks.

Music

synthesizers and samplers (JK)

mostly for beginners

A *synthesizer* is a device, usually incorporated into a keyboard, that can create a variety of sounds electronically. A *sampler* is a device, also usually incorporated into a keyboard, that doesn't actually create sounds but uses sampled ones. (Sometimes both kinds of keyboards are simply lumped together under the heading *synthesizers.)* For more details, see the entry on MIDI instruments below.

There's also something called a *sound module.* It doesn't have a keyboard (or any other means of inputting sounds) but merely stores sounds for use by a music program, keyboard or other electronic instrument. A sound module can also play back a composition without needing the instrument that created it.

MIDI (JK)

mostly for beginners

In addition to recording sound via sampling, Macs can record and recreate musical performances on instruments (synthesizers, samplers or sound modules) that use the MIDI *(musical instrument digital interface)* standard. A MIDI file contains the instructions needed to play a piece of music, rather than the actual sound produced by such a performance. It's like the roll of paper that tells a player piano what to play, as opposed to an audio tape you play back on a stereo.

To use MIDI, all you need is a Mac (any model will do), a MIDI-compatible instrument and a MIDI interface box (which translates between the instrument and the Mac).

MIDI is very popular among composers and musicians because it lets them compose and edit performances in special programs called *sequencers.* You can play a piece of music on a synthesizer, then go in the sequencer and change the pitch, stress or duration of any note, align notes

to beats automatically, copy and paste sections, increase or decrease the tempo of the piece, or transpose it to another key. Unlike digital sound editors, where you have to work with a picture of a sound wave, a sequencer displays actual notes and/or measures, so you can work with them directly.

Once you've created a track of music in this way, you can have the sequencer play it back on the synthesizer and record another track on top of the first one. You can then edit the second track in the same way, and continue layering tracks until you've recorded an entire composition. Most sequencers will let you save a composition as a standard MIDI file that any MIDI program can read.

sequencers *(JK/Craig O'Donnell)*

If you're not sure how far you want to go with MIDI, you can explore its possibilities with a basic sequencer like Passport Design's Turbo Trax ($100) or Opcode Systems' EZ Vision ($150). They're stripped-down versions of the pro-level Master Tracks Pro and Vision (described later on in this entry), so if you later decide you need more advanced features, the transition will be easy.

The two programs offer slightly different features and different approaches to the editing process, though, so you should try both before picking one or the other. Opcode also bundles EZ Vision as part of their EZ Music Starter Kit ($300) which includes a MIDI interface, The Book of MIDI (a fun and informative HyperCard stack) and Band-in-a-Box (described below).

Trax supports 64 channels and EZ Vision just 16. To create albums or soundtracks, composers use high-end sequencers that control as many as 128 MIDI channels and have much more power and flexibility. They accommodate complex editing of elaborate compositions, and support time-coding, which allows you to synchronize MIDI tracks being played on a Mac with videos running on a separate machine.

Master Tracks Pro ($500 from Passport Designs) is the top-selling sequencer in this category; Vision ($500 from Opcode Systems) is a close competitor. Beyond ($320 from Dr. T's Music Software) offers many pro-level features at a more reasonable price. When shopping for a high-end sequencer, pay attention to their hardware requirements: they often take up a lot of disk space and need a Mac with at least two megs of RAM.

✎ *Band-in-a-Box* *(JK/Craig O'Donnell)*

As long as there have been recordings, musicians have practiced by playing along with records and tapes. Band-in-a-Box Professional ($90 from PG Music) gives you more control—you tell it what chords, style and tempo to play, and it arranges the music for a backup band and plays it over your MIDI instrument.

very good feature

Band-in-a-Box will play in more than a hundred musical styles—from country to reggae—but if you don't find exactly what you want, you can create your own style and save it to reuse later. Its arrangements are fairly good, and include variations and drum fills (even chord extensions, if you want). It also comes with 100 jazz standards already arranged, so you won't have to enter them chord-by-chord.

✎ *scoring programs* *(JK/Craig O'Donnell)*

Sequencers let you compose music, but to print out a composition as sheet music, you need a *scoring* (or *notation) program.* With it you can compose directly onto a standard music staff, import MIDI files created with a sequencer, or enter music by playing it on your MIDI instrument (in real time or note-by-note). You can then edit your composition using standard music notation, and print out a professional-quality score.

The most sophisticated and best-known scoring program is Finale ($750 from Coda Music Systems). It has just about every bell and whistle you can imagine, but it's been

criticized for being extremely complex and difficult to master (Finale 3.0, which may be available by the time you read this, should be easier to use).

Encore ($600 from Passport Designs) performs most of the same functions as Finale but is much simpler to learn. Before you buy either of these programs, though, check out Coda's MusicProse ($250); it offers most of the basic notation features and if that's all you need, you'll save a lot of money.

MIDI interfaces *(Craig O'Donnell/JK)*

To connect a Mac to a MIDI instrument, you need a MIDI interface. Opcode's MIDI Translator ($60) and Passport's MIDI Interface ($90) both come with three MIDI output ports and can handle up to sixteen channels.

Opcode's Studio Plus Two ($150) connects to both the Mac's modem and printer ports at the same time, which means you can use up to 32 channels—if your sequencer will support that many. It comes with its own power supply, essential for using it with a PowerBook, and it has bypass switches that let you use a modem and/or printer when you're not using it.

MIDI instruments *(Craig O'Donnell/JK)*

You can find MIDI guitars, basses, violins, wind instruments, drum sets and xylophones, but most people use keyboard synthesizers to generate MIDI tracks. There are hundreds of synthesizers available. Aside from sound quality, look for a keyboard that's *multitimbral* (able to assign a different instrument's sound—or *timbre*—to each track, to simulate the performance of an entire band or orchestra) and *polyphonic* (able to play more than one note at a time). You'll want at least 12-note polyphony, and 28- or 32-note is better.

To get any kind of subtlety into your music, you'll also probably want touch-sensitive keys, which respond to the

force of your fingers, the way piano keys do. They're more expensive, though—professional-quality keyboards cost $900 and up.

If you can't spend that much, consider Kawai's K-series keyboards, or look at used equipment. Synthesizers like the popular (but discontinued) Yamaha DX-7 will last indefinitely if properly maintained. Find a well-stocked music dealer or two and try out as many instruments as you can before buying.

❦ *which Macs to use* (Craig O'Donnell)

Any Mac can accept MIDI data, play simple sounds or sample with MacRecorder, but for greater recording and editing capabilities, you need at least 4MB of RAM and System 6.0.7 or later. For 16-bit recording, I recommend a IIsi or better, and for high-end packages like Sound Tools or Pro Tools, a ci, fx or Quadra with at least eight megs of RAM.

You also want a big screen. A 13-inch monitor is a good low-end choice, but professionals prefer bigger ones.

Beware of PowerBooks; they have a bug that causes them to drop MIDI data in certain situations. Apple plans to fix it, but in the meantime, they've provided a workaround to software developers, so look for MIDI programs that avoid the bug. Also make sure your MIDI interface has its own power supply if you're using it with a PowerBook.

❦ *speakers* (Craig O'Donnell/JK)

The Mac's built-in speaker is fine for playing around with shareware sounds and the like, but for anything more sophisticated, you'll want external speakers. The Mac's audio output isn't meant to drive large speakers, so amplified models are best; if the speakers will be near the Mac or an external monitor, make sure they have magnetic shielding so they won't distort the image on the screen.

For casual purposes using 8-bit sound, the Koss SA-30 amplified speakers ($35 a pair) will do. If you want groups of five or six people to hear the sound, the heftier Mac-Speakers ($230 a pair from Monster/Persona Technology) are perfect. These two-way, 10-watt speakers give respectable bass and high-frequency response, have controls for adjusting the volume and bass levels, and can even create a stereo effect from monaural input. They're designed to plug into the Mac's sound port and fasten to the sides of a monitor or compact Mac.

If you're using MIDI gear or 16-bit audio, get high-fidelity speakers like Acoustic Research's Powered Partner 570s ($475 a pair). The Partners' black speaker boxes each include a 35-watt amplifier and volume, bass and treble controls. They have the same excellent sound quality that AR's bookshelf speakers made famous over 20 years ago.

For any situation involving multiple sound sources, Atlantic Technology's $400 Pattern 100 system is the best choice. It can take inputs from three sources and produces sound from a *subwoofer* (a speaker for very low notes) and two high-frequency speakers (volume and bass level controls are on the subwoofer). This 35-lb, 60-watt system can fill a lecture room with a respectable amount of sound, yet one person can carry it.

books on Mac sound and music *(ND)*

To learn more about sound and music on the Mac, find a local user group that has a music SIG (special interest group) or do some additional reading. In 445 readable pages, David M. Rubin's *The Audible Macintosh* ($35 from Sybex) covers MIDI, digital recording and editing, the use of sound in *multimedia* (the combination of sound, graphics, animation, etc.) and more. Rubin devotes a lot of space to detailed product descriptions that may soon be outdated, but his clearly written explanations of fundamentals should wear

well. The book comes with an 800K disk containing a variety of short MIDI files; some of them also come in a HyperCard stack, for people who don't have a MIDI setup.

Much shorter, more informal and, frankly, more fun is Hayden's $20 *Cool Mac Sounds* by Craig O'Donnell (who also contributed a lot of the material in this section). Its 157 pages don't cover MIDI or 16-bit audio, but they do a good job of explaining sampling, sound management and sound in HyperCard. This opinionated, idiosyncratic book includes plenty of solid, practical tips, even if the hipster style sometimes wears a bit thin.

A 1.4MB disk that comes with the book contains a lot of silly sounds and some music effects, plus sound utilities and a HyperCard demonstration stack—114 items in all.

Video

Some of the products in this section require a certain minimum system configuration. Be sure to check the requirements of any item you're interested in before you buy it.

QuickTime *(JK)*

Imagine getting a letter on disk from a friend. *[Suspend your disbelief for a moment, gentle reader, and don't ask why you're getting a letter on disk rather than on paper.—AN]* When you double-click the file, you see a color picture of her new baby pasted into the letter. Then you click a little button beneath the picture and it suddenly comes to life—the kid cries and drools, and your friend walks into the frame to say hello. *[After many years of drooling over letters, at last I can get letters that drool back at me! Isn't progress wonderful?—AN]*

Apple's QuickTime data format has made this kind of home-video-in-a-letter possible by letting you paste *dynamic data* (anything you can play back over time) into documents

the same way you'd paste in text or graphics. You can combine sounds, video and/or animation into one QuickTime file (called a *movie).* The latest versions of many word processing, database and presentation programs support QuickTime, and Apple expects it to eventually become as universally supported as the PICT graphic format.

Since the animation, video and graphics data in a QuickTime movie can take up a lot of disk space, the QuickTime extension (that's how it comes, as an extension) has built-in image compressors you can access from within applications. These can reduce file sizes by as much as twenty times, often with little effect on image quality, and they work on still images like PICT files as well as QuickTime files.

The QuickTime extension is available from Apple dealers and user groups. To use it, you need a color-capable Mac (one with a 68020 chip or better), at least four megs of RAM and System 6.0.7 or higher. (By the time you read this, QuickTime should come with the system software—Apple has committed to making it part of System 7.1.)

To get a feel for what you can do with QuickTime, consider getting Apple's QuickTime Starter Kit ($170). It includes the QuickTime extension and a collection of utilities for viewing and editing QuickTime movies, compressing PICT images, converting other file types into QuickTime movies and recording video material to disk (if you've got a video capture card). The kit also comes with a CD-ROM full of sample QuickTime movies and images.

VideoSpigot *(EF)*

To record your own QuickTime material from a camcorder, TV or VCR onto your Mac, you need a video capture card like SuperMac's VideoSpigot ($500–600, depending on what model Mac you have). It converts a video signal into QuickTime format and saves it to your hard disk. VideoSpigot can also record a video's sound, either through

the Mac's sound port (if it's got one) or through a digitizer like MacRecorder or Voice Impact (discussed above).

Video Spigot comes with a program called ScreenPlay that lets you control the recording process by clicking on-screen start and stop buttons, and displays each clip as you capture it. Once you've recorded some clips, you'll probably want to join them together using an editing program like Diva's VideoShop or Adobe's Premiere (see the next entry).

❦ *Premiere* (EF)

Premiere ($500 from Adobe) lets you put together QuickTime movies from video, animation and sound material in various formats, including PICT, QuickTime, PICS (a format for animation files) and the "native" formats that Photoshop and SoundEdit save files in.

You can add special effects like *dissolves* (fading one image out as another fades in), sharpened or blurred images, or superimposed text. You can also adjust the soundtrack, fading it in and out or adding sound from another clip.

Adobe Premiere is one of my favorite Mac programs; I've made lots of short movies from my piles of camcorder tapes, which had been gathering dust for years. *[Although it's not really an animation program, you can also use Premiere, along with any drawing program capable of saving PICT files, to create and display animations.—DH]*

Animation

❦ *traditional vs. computer animation* (DH)

Animation creates the illusion of motion by displaying, in rapid succession, a series of pictures (called *frames)* in which an image's position changes incrementally from one frame to the next.

The most straightforward way to generate the frames is to draw each one from scratch; this is called *flip-book* or, in the case of computers, *card-based* animation. But since the background and other elements of a scene may not change for many frames, it's much more efficient to draw each element separately, and only redraw those that change from one frame to the next. Traditionally, the individual images are drawn on layers of transparent celluloid called *cels*.

Unfortunately, celluloid isn't completely transparent, so using multiple layers of cels cuts down on the light passing through to the camera. As the number of cels covering the background varies from frame to frame, its hue seems to change too. Conventional animators spend a lot of time compensating for this effect, but computer animators don't have to worry about it, since there's no celluloid involved; the moving elements (called *sprites)* are kept on invisible "layers" in the computer.

Traditionally, a chief animator draws *key frames* to define the images, style and motion occurring in a scene, and assistants draw the intervening frames (a process known as *in-betweening*, or just *tweening)*. A computer can often handle the tweening (in fact, major animation studios have used computers to do this for some time).

Path-based animation relies even more on the computer—the animator creates an initial scene and maps out paths for the objects to move along, and the computer then draws the frames along those paths. Path-based animation provides more precise control over an object's motion than key frames do, but it has its own limitations.

For example, if you want to animate a bird flying through the air, you need to show its wings flapping as well as the movement of the bird itself. This requires that you first create a sequence of the bird flapping its wings, and then assign that sequence to the bird's flight path.

Some scenes are better suited to key-frame animation, others to path-based. Animation software should let you choose the best approach for any given situation.

3D graphics in animation (DH/AN)

Three-dimensional effects like shadows and reflections on the surface of objects can make an animated scene seem much more realistic. For example, imagine a car driving towards you. (To help you visualize, let's say it's a 1955 Oldsmobile convertible, coral and white; you decide if it's a Super 88 or a Ninety-Eight.) As it approaches, you see ever-shifting reflections on its "big-mouth" grille and rounded hood. As it passes, its shadow falls across your feet and more reflections play across the weird bent-chrome trim on its side. Then it's heading away, its pointy little taillights dwindling into the distance.

To create the same details using 2D images, you'd have to draw each of them in by hand, but the information in a 3D image tells the computer how to create them automatically. *[Not all 3D programs offer the choice between the Super 88 and the Ninety-Eight, though.—JK]* 2D animation is perfectly adequate for many situations, and it's generally faster and less expensive than 3D. But 3D graphics are essential when the point of an animation is to reveal hidden information through motion.

walk-throughs (DH)

A *walk-through* or *fly-through* is a type of animation that gives the observer the illusion of moving through or around elements in a scene, which generally remain stationary (which makes a good presentation tool for an architect or a designer). Some programs, like Virtus's WalkThrough ($500) and Alias' Upfront ($900), are specifically designed for creating walk-throughs.

morphing (DH)

Morphing is the smooth transformation of one shape into another, like a pop star turning into a panther. Don't expect to achieve such exotic effects on your Mac, though; creating them is a complex and time-consuming task, and the Mac products that support morphing (Super 3D, Infini-D, MacroMind Three-D, MacTopas and StrataVision 3d) are better suited to changing a cube into a sphere than a person into an animal.

animation programs (DH/JK)

Macromedia's FilmMaker ($700) is a high-quality 2D animation program with several tools that contribute to smooth, even images. It lets you fade objects from total opacity to total transparency, which is useful for creating fog and water effects, and you can even animate several effects simultaneously, including zoom, rotation and movement along a path.

For more basic needs, Animation Works ($200 from Gold Disk) is worth considering. Since it doesn't offer in-betweening, you have to draw each frame yourself, but it has tools to make that as easy as possible, like the ability to display a ghost of the previous frame under the one you're drawing, so you can use it as a template.

Many of the 3D graphics programs described in Chapter 13 also handle animation. Of the ones best suited for that purpose, MacroMind Three-D ($1500 from Macromedia) is generally considered to have the best interface. It gives you precise control over virtually all aspects of the moving scene, using a special grid modeled after Director's (Macromedia's presentation program, reviewed below). Infini-D ($900 from Specular) is a highly regarded, easy-to-use program that offers a fair degree of flexibility at a reasonable price. It's an excellent entry-level choice.

playing back video and animation *(DH/JK)*

The Mac is a great tool for editing video and animation material but it's somewhat limited as a playback device, because it can't always get the frames onto the screen fast enough. If it displays the animation below about fifteen frames per second, it will flicker. A QuickTime movie won't slow down, but the Mac may drop frames here and there, making the movie look jerky and unnatural. (If there's a soundtrack, however, it will generally be reproduced faithfully.)

Software accelerators like Macromedia's $150 Accelerator speed up the display of animation files. You can also make an animation easier for the Mac to display by designing it with a smaller frame size, fewer colors and a lower resolution. The results may not live up to your original expectations, but they'll probably be OK for most presentations and casual purposes.

For professional-quality animation, you'll either have to supercharge your Mac (with an accelerator card and more memory—and even then, the SCSI bus may be a bottleneck) or output to film or videotape (which is usually done at a professional studio).

Presentation software

basic presentation programs *(Peter Ryce/JK)*

Presentation programs are basically tools for producing electronic slide shows, usually to accompany talks. You can create the slides from scratch using the program's own text and graphics tools, or import them from other sources.

When you display a presentation on a Mac monitor, each slide fills the screen, covering the usual menu bar, windows and icons, regardless of your monitor size. You can also print the slides onto transparencies for an overhead projector, have a service bureau make them into actual

photographic slides or put the presentation onto videotape (with video-out cards made by RasterOps, Truevision, Generation Systems and Mass Microsystems).

Persuasion ($500 from Aldus) and PowerPoint ($400 from Microsoft) were two of the first presentation programs. Both offer a *speaker's notes* format, which lets you print out a miniature of each slide with attached lecture notes, and a *handout* format for your audience, showing up to six slides per page.

PowerPoint's ease of use has made it popular, but Persuasion offers many more text and graphics features, plus an extensive set of charting capabilities. If you're displaying your presentation on the Mac, Persuasion offers fancy transitions between slides, like dissolves and an effect that makes the screen look like a venetian blind being turned to reveal the next slide.

More ($400 from Symantec) offers handout and speaker's notes formats, good graphics and charting, and even more transition effects than Persuasion. Both programs can outline—in fact, that was More's original purpose as a program (see Chapter 9 for more on it). But Persuasion's support for QuickTime and other extra features give it the edge as a presentation program, at least as of this writing.

None of these programs support sound or animation, but you can add these to your finished presentations by importing the presentation into an animation program (for this purpose, an inexpensive one, like Meyer Software's $175 On The Air, is all you need). Still, for the ultimate in multimedia capability, you're better off creating the entire thing in Macromedia's Director (described in the next entry).

Director *(DH/Peter Ryce/JK)*

Director ($1200 from Macromedia) is the Mac program most commonly used for serious animation work, but it

was originally designed for creating interactive presentations. *(Interactive presentations,* in which a viewer's selection of on-screen choices affect what happens next, are often used for automated training programs and for computerized video kiosks like those in shopping malls and tourist information bureaus.)

Director's presentations can include sound, animation and QuickTime movies, and can even control external devices like CD-ROM, videodisc players and MIDI instruments. Although Director can't handle 3D graphics directly, it can produce the same effect by importing frames generated in 3D programs.

Director lets you precisely control the timing of all the components—sound, animation, etc.—on a special grid that shows each component as a row and each time interval as a column. Most people find Director's design interface fairly straightforward for basic tasks, but to access its more sophisticated capabilities (including interactivity), you have to use a programming language called Lingo, which is not so straightforward.

other multimedia programs *(JK)*

HyperCard, which comes with the Mac, was the first Mac program used for interactive multimedia presentations. SuperCard ($300 from Aldus) imitates HyperCard's interface but has more graphics tools, animation capability, and other strengths HyperCard lacks.

Both HyperCard and SuperCard can control external devices, but neither comes close to the power and versatility you get with Director. (Like Director, they both require you to use a programming language for anything more than a simple slide show.)

Chapter 16

Education and entertainment

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Games and learning

educational, shmeducational *(SA/ND/AN)*

Why do we insist that computer games for children be "educational"? Unless kids are crippled by bad teaching or physical or emotional blocks, they can't *not* learn from anything they do. So don't rationalize that they're learning hand-eye coordination (even though they are); just tell yourself they're having fun. That's what counts in games (and educational programs generally). When they aren't fun, kids don't play them and therefore don't learn from them.

It's usually easy to tell whether an educational program for older children is teaching what it's supposed to, but programs for very young children are harder to evaluate. Here are some things to consider:

- Can the children do everything by themselves? Of course you should do some of it with them, and three- or four-year-olds might need help in getting started, but after that, they should be able to handle things on their own. (This not only gives them a feeling of control, but saves your sanity too.)
- Some programs try to teach too many things at once. You want ones that know how to focus on particular tasks and concepts, and that dole them out in easily learnable chunks.
- How are wrong answers handled? After two or three wrong answers in a row, the program should provide a hint, or the answer itself, and should let the user try the same problem again, after the answer's been shown or the hint's been given. (Once, when her son kept getting wrong answers in an alphabet game even though she *knew* he knew the answers, Sharon asked if he needed help. He said: "No, I like the sound it makes when you give the wrong answer.")

- Don't worry about the absence of color—young kids don't care about that, nor does it matter educationally (except, of course, in games that teach color recognition).

In the next two sections, we've tried to put the software that's suitable for the youngest users first, and software for the oldest users last (so a game that teaches you how to clean your dentures will come at the end of a section, and a program on basic parent manipulation will come at the start). In the last section, we've grouped games by type.

games are fussy *(SA/ND/SM)*

mostly for beginners

Games—and educational programs, which are usually disguised as games—sometimes make unusual demands on your system (and on you). For example, while few business products are copy-protected, many games are; you may need to insert the master disk (the one you bought), or supply arcane information you look up in the instruction booklet.

Games also tend to use some pretty fancy programming tricks to squeeze top performance out of your Mac. Specific software may need to be in just the right spot, or the game may need to use a specific area of memory another program is occupying. If you have trouble, remove any unnecessary extensions and close any other open programs. If you still run into problems, boot from the floppy and run the game from there, instead of from your hard disk.

important warning

Some games run only on compact Macs (ones with 9" screens), some run only in color, and many don't run if another program is loaded into memory. If you upgrade your system, you may have to leave some of your favorite playthings behind. Before you buy a game, find out which Mac models it works with (we try to tell you that when we can). If you have problems, call the product's tech support; a newer version of the program might help.

Educational software for kids

the AmandaStories *(SM)*

When he was just two, my son Rowan learned to use the Mac with these wonderful creations by Amanda Good-enough. They're picture books made into HyperCard stacks, with several hidden buttons behind each picture, so a story can be "read" several different ways. They include some very basic sound and animation, and the drawings are simple, uncluttered (easy for a toddler to focus on) and utterly delightful.

Voyager sells four disks for $25 each, with two to four stories per disk; you can also get all four volumes on a CD-ROM for $60. Two disks feature a cat named Inigo—who's deftly drawn with a few strokes of what looks like a spray-paint tool—and the other two relate the adventures of a gawky camel. (Originally the AmandaStories were shareware, and three of them are still available that way.) They work on any Mac with one meg or more of RAM and HyperCard.

[Older kids can enjoy them, too; my eight-year-old son Cameron still opens them up occasionally. And if you have a little HyperCard programming skill, you can use them as examples and show older kids how to create their own animated stories.—ND]

[Rowan, Cameron—what kind of names are those? Doesn't anyone use wholesome, all-American names like Mike or Steve anymore? Our country is in decline, and fancy names like Rowan and Cameron are probably 90% of the reason.—AN]

Kid Pix *(David de Leeuw)*

Brøderbund took a basic paint program and added great sounds and "stamps" (little pictures you can put anywhere with a click). They also made it easier to use, by giving it

bigger tool icons and fewer choices. The result is Kid Pix ($60 list) and it's terrific; even adults will find it amusing.

Soon after my son Rowan learned to point and click (at age two, with the AmandaStories), he started using the pencil to draw lines with Kid Pix (for that age, set the mouse at its slowest speed). The stamps let him put trees on his hills, frogs in his ponds and flying saucers in the sky.

very good feature

His favorite feature is an eraser that blows up your drawing, complete with the sound of an explosion, leaving behind a blank screen. *[That's my favorite too, and I've never even seen it.—AN]* You don't like the cow you tried to draw? Dynamite it! (I think this should be made standard on word processors.)

very good feature

There's a wacky pencil that draws dripping lines, branching lines, two-color lines and symmetrical spiderwebs. *Mixers* transform the whole document, inverting black and white for instance, or tiling a piece of the drawing over the whole area. These features are powerful, but not adjustable—kids get the impact of transformations and special effects without having to learn how to control them.

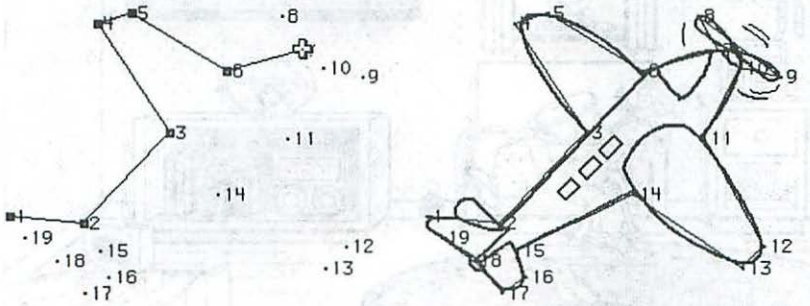
Now three, Rowan's played with lots of other kids' programs, but he spends most of his computer time with Kid Pix. He loves to print and fold his drawings, then "give them for cards." *[My eight-year-old uses regular graphics programs, but still plays with Kid Pix.—ND]*

It requires at least a Plus, System 6 or later, two 800K drives or a hard disk, and 1MB of RAM (2MB for color). There's also a Kid Pix Companion for $40 that lets you easily animate your drawings or turn them into slide shows.

KidsTime *(SA/ND/SM)*

KidsTime ($50, from Great Wave) was one of the first Mac programs for young kids, and it's stood the test of time. It includes five activities, the first three of which teach prereading skills: ABKey builds character recognition;

Match-it teaches recognition of same and similar objects; and Dot-to-Dot (shown below in progress and completed) teaches number recognition and sequencing.

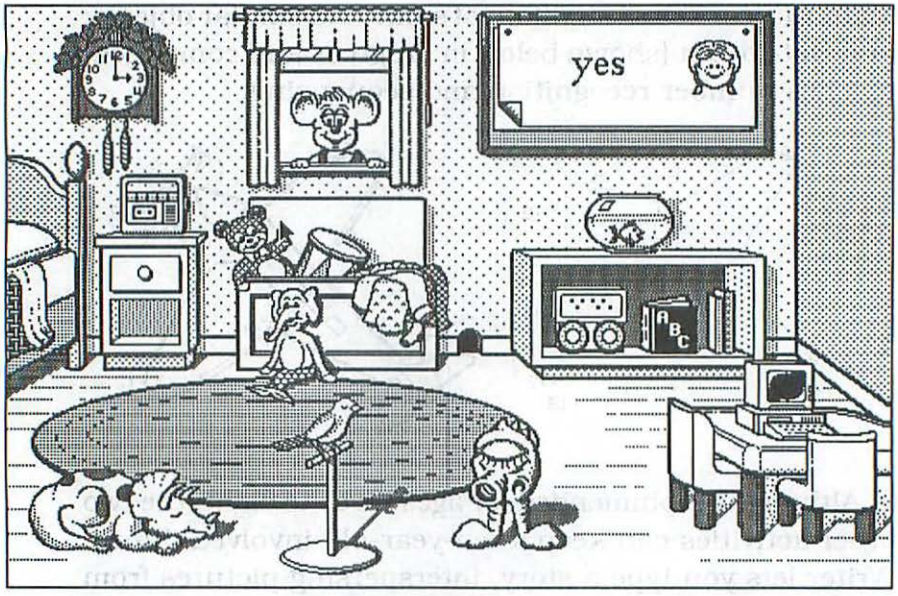


Although recommended for ages three to eight, the two other activities can keep a ten-year-old involved. StoryWriter lets you type a story, interspersing pictures from a special font. The program then reads the story back to you in a robotic computer voice, saying the word for the picture. KidsNotes is a terrific music program—no surprise, since the same company publishes a music program called ConcertWare+. KidsTime works on all Macs.

The Playroom *(SA/SM)*

In the Playroom, you click on objects in a picture of a playroom (see the picture at the top of the next page) to make things happen (or to go where you click). Click on the bird and it sings. Click on the nightstand's drawer and it opens—and a balloon floats out. Click on the balloon and...well, we don't want to give away the plot. Click on a letter on the keyboard on the screen (or press that key on your Mac's keyboard) and the letter appears on the monitor and is identified. Clicking on the mouse hole takes you inside, where you can choose from three simple board games you can play alone or with a partner.

Playroom ($50 from Brøderbund) is terrific for three- to eight-year-olds. It works on any Mac from the Plus on up, including Mac IIs. It requires a hard disk and System



6 or later, and you have to look up a simple picture code in the manual every fifth time you open it.

A Silly Noisy House *(SM)*

If you've got a CD-ROM drive, here's an imaginative game ($60 list, from Voyager) for kids three to eight years old. As in The Playroom, when you click areas of the screen or objects, things move, play music and/or make noise, or you're taken to a new view.

A Silly Noisy House starts with a cross-section of a large house; you click on a room to zoom in. Each room has several different views and is loaded with objects that—as promised—do silly, noisy things. A pitcher fills glasses with water, a rocking horse makes galloping sounds, a pie erupts with blackbirds as you hear *Sing a Song of Sixpence.* Some objects are even unpredictable, responding to clicks in different ways at different times.

The animation is great, and the sound is high-fidelity, really impressive compared to the digitized sound in most programs (though you need headphones or external

speakers to hear it). You also need an LC or a Mac II, 2MB of RAM, System 6.05 or later and a hard drive with 6MB free (the graphics part of the program runs off your hard drive while the sound and music come off the CD).

Reader Rabbit *(SA)*

Reader Rabbit is a program for early readers that uses three-letter words exclusively. The program has four activities, two of which I like. In one, a letter appears on one of three blank spaces, and you have to choose words that have that same letter in the same position. Words that don't match get dumped into the garbage. When you've come up with enough correct words, a rabbit does a dance—with good sound and animation. In the other activity I like, you have to fill the cars of a train with words that share two out of three letters with the words in the car before. When the cars are filled, the train drives off the screen.

Reader Rabbit is a good program, if you're willing to help children use it. It works on Macs from the Plus on and requires a hard disk.

three arithmetic games *(ND)*

Anytime a new user signs on to Super Solvers OutNumbered! ($60 list, from The Learning Company), the game goes into beginner mode, explaining the rules on-screen as you play. My eight-year-old installed it himself and started playing, without one look at the instruction booklet.

It's a great game that combines arcade-style action and logical problem-solving, and unlike many educational games, it induces you to drill by making that a prerequisite for more play. When you solve arithmetic problems (you can control how hard they are), you win clues that help you find out where the bad guy is hiding.

In each room, there's also a problem that involves reading charts, tables or dials. The problems are interesting—more like puzzles than drill—and there's even an

on-screen calculator to help make sure the focus isn't on arithmetic. I enthusiastically recommend Super Solvers for kids seven-to-ten who can read pretty well. It works on a Mac Plus or later with a hard disk, and requires at least System 6.0.2.

In NumberMaze ($50 list, from Great Wave Software; $70 for the color version), you guide a playing piece through a maze. It's interrupted by obstacles, and you have to solve problems to get around them. Beginners count objects like turtles or toy sailboats. The problems gradually get harder, through 48 levels of difficulty, which include all types of computation and word problems. You can ask for harder or easier problems (or mazes) *anytime* during play, and you get hints if you're having difficulty (the program concentrates on trouble areas automatically).

Of the three games in this entry, NumberMaze covers the widest age range. My son started using it as a maze-crazy toddler just learning to count, and he still likes it in third grade. He especially likes the different mazerunners and their sounds: a galloping horse, a roadster and a mouse. NumberMaze requires a Mac 512Ke or better.

New Math Blaster Plus ($60 list, from Davidson) is the weakest of these three games. Three of its four modules are arithmetic drills, in six levels, from single-digit problems to fractions (no word problems), mixed with some arcade play. Only the fourth requires reasoning, rather than instant recall of math facts.

Math Blaster's strength is the variety of games, but the math is monotonously dull. My eight-year-old couldn't start this one up on his own, and the manual didn't help because it's directed to teachers rather than players. Davidson says it's appropriate for ages six to twelve, but I think kids older than ten would get bored with it pretty fast. It requires System 6.0.4 or later, and runs on a Mac Plus, SE, Classic, LC or Mac II with 1MB of RAM (2MB for color).

Swamp Gas *(Cameron Dunn)*

Swamp Gas ($50 list, from Inline Design) helps you learn US geography as you guide a little alien with its UFO through missions around a map of the US. After you complete each trip, you get to play one of three silly arcade games (they're all fun), with slapstick (banana peels, pies in the face) rather than fighting.

I like to play at the beginner level—finding states by shape—because the game gives hints if you ask. Kids (or grownups) who know more can try to find cities. To make it tougher, you can set the game to ask multiple-choice questions about the states, or you can choose more stops per mission—up to 50! You can play by yourself or with up to three other people.

[Swamp Gas requires System 6.0.5 or later, a hard disk and a Mac Plus or greater; you need at least 2MB of RAM if you want color. It's suggested for ages six and older (you need to be able to read). Cameron, who's eight, uses a map of the US to help him play this game. I like Swamp Gas because when more than one child plays, the game keeps track of whose turn it is—a real load off the nearby adult "referee."—ND]

the Carmen Sandiego series *(Mary Toth)*

Brøderbund's wildly successful Carmen Sandiego series started with Where In the World Is Carmen Sandiego? and now includes Europe, the USA and other countries throughout several centuries (most titles are $50).

When in Time is Carmen Sandiego? teaches history as well as geography. You're assigned a mystery case, and you have to collect enough clues to get an arrest warrant and find the suspect in time.

Each screen presents you with a historical place and time. You call on informants or witnesses who offer clues about who the crook is, and hints about the next time

and place to track the suspect. For example, if a clue says the suspect stole something from Francisco Pizarro, you'd know to travel to 16th-century Peru. And just on the off-chance you *wouldn't* know that, a copy of the New American Desk Encyclopedia is included with the game.

Besides covering junior-high history basics like who was president when Napoleon sold us Louisiana *[I wonder how many of our adult readers know this "junior-high history basic?"—AN]*, the game is very strong on the history of non-European cultures. Since Asia, Africa and pre-Columbian America were covered lightly in older textbooks *[to put it mildly—AN]*, this program holds lots of fascinating new material for adult players.

[This whole series is great for teaching people how to use reference materials (which are provided with the software). I've used them tutoring adults who were trying to improve their reading skills.—SM]

[The eight- and nine-year-olds I've watched hunt for Carmen Sandiego don't really learn much geography unless parents or teachers intervene. Four levels into the game, they still don't really have a clue where Colombo is (or even that it's a city, not a country or a continent); to win, all they need to know is that it's somehow connected with the name "Sri Lanka." They love the game though, and it's training them to get comfortable looking things up in reference works.—ND]

[Where in Europe Is Carmen Sandiego? isn't for people who want a lot of shooting and stuff like that, but if you like to think, it's for you. Whenever you come into a new country, it teaches you all about it, so you learn about Europe. I loved it, and you probably will too.—Jessica Albert]

Annabel's Dream of Ancient Egypt *(Mary Toth)*

If you have a CD-ROM player, this interactive multimedia story can introduce ancient Egypt to third-to-fifth grade

kids. There's lots of historical material, a home pyramid-building project, a little course on papermaking, a vocabulary-building feature that includes correct (spoken) pronunciation, and even musical selections from *Aida!*

Featuring a cat named Annabel, it has threads that lead off in all directions, and you can easily backtrack or skip through parts of the story. It even touches on sibling rivalry (Annabel has a troublesome sister). The program requires a Mac Plus or better and at least 2MB of RAM. It costs $85, from a company called Texas Caviar (a group of educators in the Austin area).

Educational software for adults

teenagers too (AN)

Despite this country's ridiculous infantilizing of teenagers, they are adults in everything but name and legal status. And don't say that they don't have the life experience of people in their twenties. Of course they don't. Neither do people in their twenties have the life experience of people in their thirties, nor people in their thirties the life experience of people in their forties. Continue with this absurd line of reasoning and soon Ronald Reagan and Bob Hope are the only adults among us—you see why I call it "absurd."

By the way, do you know where the idea that people become adults at 21 comes from? From the ancient idea that people shouldn't be allowed to participate in community decision-making until they'd been adults *for seven years*—which, in those days of poor nutrition and relatively late puberty, was figured at 14 + 7.

This is all by way of saying that, in this section, software aimed at teenagers is lumped together with software aimed at other adults.

The Geometer's Sketchpad *(Mary Toth)*

This program is a great way to get better grades in geometry (I hope there's a corresponding algebra program on the way soon). It gives you a straight-edge, a compass and a pointer for labelling points in a diagram. With these tools, you can draw every plane figure in Euclid.

Other tools let you draw parallels and perpendiculars; bisect angles; locate midpoints of segments; rotate, translate, reflect and dilate figures or parts of figures; and measure structures (the measurements update automatically when you modify the structure). Even better, there's animation that lets you illustrate things like the plotting of trig functions and the connection between geometry and basic physics. Lots of animations come set up, and it's easy to create your own.

There's also a macro feature, and loads of sample files with dazzling scripts that demonstrate everything from basic geometry to fractals. Stepping through geometry demonstrations at your own pace really gives you a feeling for how a proof follows from a geometric construction. Published by Key Curriculum, the Geometer's Sketchpad costs $170 for a single-user version, $400 for a ten-pack.

StudyWare for the SAT *(Mary Toth)*

This is a straightforward drill program with two advantages over SAT practice books. First, there's a timer and scorekeeper built in. Second, you can select a *Just Training* mode in which the program gives you hints instead of simply scoring. Most of the questions are nearly the same as those on the real SAT.

The publisher (Cliffs StudyWare) claims it improves scores by 50 to 100 points on each part of the test. Informal testing I did on myself and a number of high-school friends supports the claim. The biggest verbal-score increase was for a student whose first language was Spanish. Since the vocabulary section of the SAT can be said

to measure exactly how white, suburban and middle-class you are, this program may be of particular value to students who aren't. The $50 program runs on a Mac Plus or better.

SimCity Supreme *(Mary Toth)*

In an enlightened democracy, citizens would be required to play a day's worth of this game before being allowed to vote in local elections. It puts you in charge of all decisions for a city—you decide where the housing goes, what transportation the city has, where the factory and retail areas are, what the tax rate is, how much to spend for police and fire services, and so on. Ten minutes into the game, your appreciation of the challenges facing civic officials skyrockets.

For example, you rezone some park land for industrial use to reduce unemployment, then find that property values—and hence tax revenues—have dropped because of pollution from the factories. At the beginning of each time-cycle in the game, you have to allocate city revenues in the face of a chorus of complaints from citizen groups who feel you're ignoring them. If you're in a sporting mood, you can toggle the *No Disaster* option to *Disaster* and face an earthquake, flood, tornado or Godzilla tromping through town.

SimCity includes some historical and contemporary city simulations. A cozy place to start is Bern, Switzerland, where apparently nothing ever goes wrong. Once you're used to that, try Hamburg after the WWII firebombing or San Francisco after the 1906 earthquake.

SimCity runs in black-and-white on any Mac later than a 512Ke, and in color with an SE/30, LC or Mac II with 2MB of RAM (but black-and-white seems to suit the distressing realism of the game). It's $60, from Maxis.

Hidden Agenda *(AN)*

Hidden Agenda is an extremely intelligent and beautifully designed computer game. A corrupt dictatorship has just

been overthrown in the mythical Central American country of Chimerica. Your job as the new president is to appoint a cabinet and guide your country through the many difficulties that await it, balancing the demands (and threats) of various groups struggling for power. At the end of three years, you receive a written report several pages long that summarizes your achievements and failures.

I asked Davida Coady, who knows a lot about Central America and nothing about computer games, to play Hidden Agenda. She was very impressed with how challenging and involving it is as a game, and also with the thoughtfulness and knowledge that went into its simulation of reality. A lot of computer games claim to teach you something about the real world; this one really does.

Hidden Agenda: Scholastic Edition (originally from Springboard, now from Scholastic Software) costs $60 and works on all Macs from the Plus on up.

The Blind Watchmaker *(AN)*

The Blind Watchmaker, by the brilliant British evolutionary biologist Richard Dawkins, is one of the most interesting and important books I've ever read. Subtitled *Why the evidence of evolution reveals a universe without design*, it's the clearest and, at the same time, the most profound explanation of the theory of evolution and its implications that you'll ever find. If you have the slightest interest in this topic, you should definitely buy this book ($9 in paper).

To help demonstrate his points, Dawkins wrote a companion Mac program, which is also called The Blind Watchmaker ($11 from the book's publisher, W.W. Norton; there's a coupon in the back of the book). The software lets you "breed" *biomorphs* (animal- or plantlike shapes). This process is natural selection made concrete—almost tangible—and shows, as no mere explanation can, how extraordinarily complex an organism can be produced by selective breeding—one step at a time.

I could go on for twenty pages describing what you can do with this fascinating piece of software (and another forty describing Dawkins' theories and arguments). But why not get it directly from the horse's mouth? (Speaking of which, he has some interesting things to say about the evolution of horses.) Both the book and the software are *highly* recommended.

Dawkins has begun development of a color version of The Blind Watchmaker; I've shown an early version of it to several people and they've all been mesmerized by it. He's trying to find a developer to finish and market the program; if you represent a company that may be interested, AppleLink a note to John Kadyk at *Mac.Bible* and we'll forward it. (Sorry, but we can only forward messages about marketing the program, as Dawkins already gets more mail than he can answer.)

❦ *The First Ever Clam & Craft Cookbook* (SM)

Sure, Hidden Agenda and Blind Watchmaker are important programs, but how can they compare with this four-disk HyperCard stack of tasty clam recipes (52 main dish, soup and omelet recipes and 24 dips and appetizers)? You also get a reference stack about clams (the various types, where and how they live, etc.), a storybook about spirit-beings from another galaxy who come to earth and take the form of little creatures called Clamkins, and an actual model of a Clamkin (it's made from clamshells and fake fur, and the stack gives you detailed instructions on how to make more of your own). Finally, there's an on-disk mail-order catalog for clothing, mugs and mousepads, all bearing pictures of the Clamkins.

The recipes and reference cards are useful and interesting. As for the Clamkins...well...words fail me. *[Not me. The Clamkins make troll dolls look like Michelangelo's* David.—*AN]* If you like clams—or kitsch—this product is for you (it sells for $40, from Millimac).

Games

free (and cheap) games (RS)

For a long time, one of the complaints about the Mac was that there weren't any good games for it. Well, now there are *plenty* of good games for the Mac—many, many more than we have room to review here—and lots of them were adapted straight from great arcade games. What's more, the ones in this entry (and many others) are either very low-cost shareware or free (you can get them from bulletin boards and user groups).

Marc Dutil's SQIX is a well-done clone of its namesake Atari arcade game, which involves a line bouncing around a rectangular playing field. Hiroyuki Kodani's Blocker is another free game; it combines the pursuit aspects of the PacMan arcade game with the strategy required by Othello (too bad it doesn't use full animation). In Gary Coy's Praxis (also freeware), you fight off enemies with something called a *space mace*, and you can also shoot at them.

John Butler's Macman 1.0.2 is a very good black-and-white shareware version of the arcade game PacMan; it's designed to fit the 9" screen of compact Macs but it runs on any monitor. There's also a perfect color clone of PacMan called Pacman. It's freeware by M. Tsuji, and runs only in color on 13" monitors. (If you're willing to shell out around $80, you can use a Gravis MouseStick to control the action on this one.)

Stunt Copter and Cairo Shootout are two must-have Mac games that were written in 1987 by a young programming genius named Duane Blehm. When Duane died, his parents put the programs in the public domain in his memory.

Stunt Copter is simple in concept, yet it's fun and difficult to master. You control a helicopter with a stunt man hanging from it. A hay wagon gallops below. You try to

maneuver your copter until its speed matches the hay wagon's, so that when the stunt man drops (with a click of the mouse), he falls softly into the hay.

You have to allow for the effects of wind, gravity, speed and clouds (which—unrealistically—slow the stunt man's descent). The higher the stunt man drops from, the more points you get. *[At beginner levels, this is a good game for children as young as four or five.—ND]*

Cairo Shootout is an arcade shooting-gallery game based on the Egyptian graphics in the font Cairo. It includes music from *Walk Like an Egyptian* (a 1980s pop tune by the Bangles) and a hieroglyphic puzzle in which you have to find the location of the king's tomb. It's well done, and fully animated.

Tetris *(SA)*

Tetris ($40 list, from Spectrum Holobyte) is one of those games that became an instant classic. As with most classics, the rules are simple. Objects made up of four connected squares in various configurations slowly fall, one at a time, from the top of the game screen to the bottom. As a shape falls, you can rotate it and move it to the right or left. The object is to arrange the shapes so that when they land, there'll be a solid row of little squares from one side of the window to the other. When you accomplish that, all the squares in the row disappear, everything above it slides down, and you get some points.

For all its simplicity, Tetris is pretty addictive. It works in black-and-white and color with some impressive background graphics. Both feature Russian theme music in the introduction, and you can choose to keep it on while you're playing. Tetris works on any Mac with at least 512K of RAM. Super Tetris ($50) lets you save games or play timed ones, and also lets you play against an opponent. It requires at least a Mac Plus.

[For the miserly, there's a simple yet satisfying shareware game called Columns that operates on a similar premise. You line up boxes of the same pattern horizontally, vertically or diagonally as they fall; if you're successful, they disappear with a pop when they hit bottom. It's good for kids as young as six or seven.—ND]

Wordtris *(Jan Brenner)*

If you've ever been hooked on Tetris and you love word games, you'll find Wordtris ($40 list, from Spectrum Holobyte) even more addictive. To score points, you have to quickly arrange falling alphabet blocks into words. At advanced levels, this is a pretty tricky business, testing not only your hand-eye coordination but your ability to pluck just the right word possibilities from your brain at lightning speed.

There are two especially nifty things about Wordtris. One is that you can set the length of each game, playing for as little as two minutes or until the men in the white coats come and drag you away.

The other nifty thing is the Magic Word (usually 5–7 letters long) that appears at the beginning of each game. If you manage to form this word, heavenly chimes sound, all the letters clogging the playing area disappear, and you suddenly have zillions of points. *[I thought a duck comes down from the top of the screen and the man with the moustache gives you $50.—AN]*

My only real complaint about Wordtris is that it fails to recognize some common words. *[Since this is a family publication, we won't tell you what words Jan thought Wordtris should recognize.—Thought Control Supervisor, Sector 6]* The black-and-white version works on any Mac with at least 1MB of RAM. For color you need a Mac II with at least 2MB RAM, an 8-bit video card and a hard drive. System 6.0.3 or later is required.

Sargon and Battle Chess *(CS)*

Both Sargon and Battle Chess are good Mac chess programs. Both can challenge good players and both work well. The main difference is that with Battle Chess you can use goofy animated chess pieces if you want, while Sargon's more formal. Sargon is $50 list from Activision. The black-and-white version of Battle Chess is also $50, but you can get a color version on a CD-ROM (from Interplay).

Go Master and Go Junior *(CS/Mary Toth)*

Learning the rules for the Japanese board game Go takes about five minutes; mastering its strategy takes a lot longer *[several centuries or so—AN]*. Go is the most strategically complex game yet devised. *[Don't confuse it with Go Fish!, a somewhat simpler game.—AN]* A computer chess program started beating grand masters in 1991, but Go Master—the smartest Go program so far—only plays near the bottom of the professional rankings.

Not that *you'll* put any beads of sweat on Go Master's brow. Unless you studied at a Go academy in Japan or at a military college in Korea, Taiwan or Japan (where Go is a required subject), Go Master can beat you in its sleep. The program lets you choose different levels, from beginner to advanced-amateur, but unless you're an experienced player, it probably makes more sense to start with the cheaper, simpler Go Junior, with its emphasis on tutorials. Go Master costs $70 list and Go Junior $35 (both from Toyogo). They'll run on any Mac later than a 512K.

Strategic Conquest *(JK)*

Strategic Conquest ($60 from Delta Tao) is a powerful program—it turned this long-time peace-monger into a cunning and remorseless empire-builder. *[Your friends could always see the seeds of this in you, John.—AN]* The object of the game is to take over the world by military force while an enemy (the computer or another player) tries to

do the same. At the start of each game, the computer creates a randomly-generated world map, which is blacked out until you explore it with your planes, ships and armies.

Once you've invaded a city, you can use it to produce more armies, fighters, bombers and, if it's a coastal city, any of several naval vessels. As you expand your empire, you begin to encounter the enemy's forces, and your success in the ensuing battles depends on how carefully you've chosen and deployed your own forces. An average game lasts anywhere from four to ten hours.

Strategic Conquest is dangerously addictive; I usually set a firm quitting time before starting to play, and I have friends who've had to do the same. And, since rabid conquest becomes an end in itself, I always end up with a hollow feeling at the end, when there's nothing left to conquer. *[I think there's a lesson in this, but what can it be?—AN]* Strategic Conquest requires one meg of RAM and System 6 or later.

Dark Castle and Beyond Dark Castle *(SA/ND)*

Dark Castle has been around for a long time, and is only in black-and-white, but it's still an entertaining adventure game. You move the Prince through the Dark Castle and its dungeons. His enemies are legion and his only weapons are rocks.

Beyond Dark Castle is more of the same, and lets you save up to five different games. (Dark Castle doesn't let you save your position, so even if you stop before all your lives are used up, you have to start from the beginning the next time you play.)

Both versions are great; it's too bad that Silicon Beach has stopped developing new games. Dark Castle works on all Macs except the Classic II. Beyond Dark Castle works on everything except the original 128K Mac, the Mac 512, the Portable and the Classic II. They're both $50.

Loom *(Andrew Rhoades)*

Loom is a $45 adventure game that combines music with fascinating graphics. You're Bobbin Thredbare, the last of a great line of sorceress weavers, and you've got the task of saving the world from complete destruction. *[Don't we all?—AN]* Starting on the island of Loom, you embark on your journey with a limited number of musical spells. As you encounter different surroundings, you must pay close attention to the musical notes that emit from various actions and objects; they unlock spells and increase your abilities.

You should click on everything, since you never know what holds the key to your next level of spell weaving. Be sure to listen to the cassette that's included to familiarize yourself with the characters and background of Loom. If you do run across puzzles that seem unsolvable, LucasArt Games has a great support network with hint books and a (not-so-cheap) 900 number. Loom requires System 6.03 or later (you get enhanced music with System 6.07).

Indiana Jones and the Last Crusade *(Andrew Rhoades)*

Indiana Jones is a $50 adventure game that closely follows the movie. It begins when Indy discovers that his father has disappeared while trying to recover the Holy Grail. First Indy has to find his father's grail diary, then follow his trail to Venice. After Indy finds his father, they search for the grail together, and try to make sure it doesn't fall into the hands of Hitler and his Nazi legions of doom.

There are lots of puzzles, mazes and fight sequences, and you even get to commandeer a Nazi biplane. Be sure to save the game often when trying something new or difficult, so you don't have to constantly start over again—the fight sequences are especially tough.

You get your own copy of the grail diary and it's a good idea to become familiar with it. Remember, there's always a solution to any of the puzzles. Be sure to drag and click

the pointer on everything; it's the only way to pick up the objects and find out what you need to know.

As with all LucasArt Games, there's great attention to detail, good support and accessible hint books. This game requires System 6.0.2 or later, and supports both black-and-white and color.

Scarab of Ra *(Janet E. O'Brien)*

In this game, you start at the top of a pyramid and explore a series of three-dimensional labyrinths. When you complete a level—by finding the key to the locked door at the end of the current one—you get to go on to a larger and more complex level. As you move through the labyrinths, you collect food, supplies and golden treasures, while avoiding hidden traps, carnivorous animals, thieving monkeys and the relentless Guardians—mummies, actually, who still give me a start when they suddenly appear on the screen.

In general, your success depends on a mixture of luck (coming across the tools and supplies you need to survive) and skill (how you manage what you find and how fast you navigate though the labyrinth). You can slow down your speed setting so that you're more likely to see traps in advance, and if you're about to starve, you can dump your gold (so that you're carrying less weight) and hope that you find food left behind by unsuccessful explorers.

You win the game by collecting three mystical objects—the Scarab, Staff and Crown of Ra. This is a lot harder than it sounds. I've only accomplished an outright win three times in the last few years. A good game lasts 45 minutes, and usually results in your death from starvation or failing health due to wounds. *[Sounds great!—AN]*

The animation is rudimentary, yet Scarab of Ra will mesmerize you for long periods. The Save Game capacity is handy, as there seem to be an infinite number of

levels. If you have things that have to get done in your life, don't even think about starting this game.

Glider *(Andrew Rhoades)*

Glider's one of the most addictive games I've ever played. It's easy to get started, but hard to master the moves you need for high scores.

Your job is to maneuver your paper airplane through the average American house, using air-conditioning vents and an occasional fan to move you along. There are only 60 rooms *[Andy, if you think the average house has 60 rooms, your career as a real-estate agent is doomed.—AN]* but it might as well be 6000. There are other airplanes and balloons to avoid, as well as bouncing balls, a paper shredder and an over-active fish who can't seem to stay in its bowl.

There are great sound effects that reward you when you complete tough moves. The only problem with this game is that it's too hard to stop playing. Glider is from Cassady & Greene and costs $50. It requires at least a Mac Plus, 1MB of RAM and System 6.04 or later.

Apache Strike *(SA/ND)*

In this game, you fly an Apache helicopter *low*, between tall buildings; you duck under bridges, or pull up in time to avoid them, dodging bombs all the time. The ever-changing maze of buildings (in various cities) shifts as you turn the helicopter, but they're just simple line drawings. There's no peripheral vision, so you need quick reflexes.

Apache Strike is more difficult than it looks—but then, flying a helicopter is more difficult than it looks. Version 1.2 works on all Macs except the Classic II, the 512Ks and the 128K. For the 512K, you need version 1.0 on two 400K disks; for the 512Ke, you can use version 1.0 on a single 800K disk. It's from Aldus' Consumer Division, which used to be Silicon Beach Software.

PGA Tour Golf (SS)

very good feature

If it's too hot, cold, wet, or expensive to go golfing, try this $60 program from Electronic Arts. The gorgeous colors and authentic sound effects are among the best I've seen for golf games on any computer. You and up to three friends can compete in tournaments at four professional courses: PGA West Stadium, Sterling Shores, Avenel and Sawgrass.

But keeping up with the pros is tough. You must shoot par on each round; if you don't, you're tossed out of a tournament in the early rounds. To bring home any prize money, you have to do much better than par. *[Steve, I don't know quite how to break this to you, but you can't "bring home any prize money." This is just a computer game. The computer isn't going to give you any money no matter how well you play. I'm sorry. (Poor guy, he's been working too hard.)—AN]*

You hit the ball by clicking the mouse three times. The first click starts your swing, the second and third determine how hard and straight (respectively) the ball is hit, using a special gauge on the screen called a *stroke bar.* There's no rain, but you do have to watch out for the wind—gusts up to 20 mph are possible. (There's also a putting green and a driving range, and you can play practice rounds.)

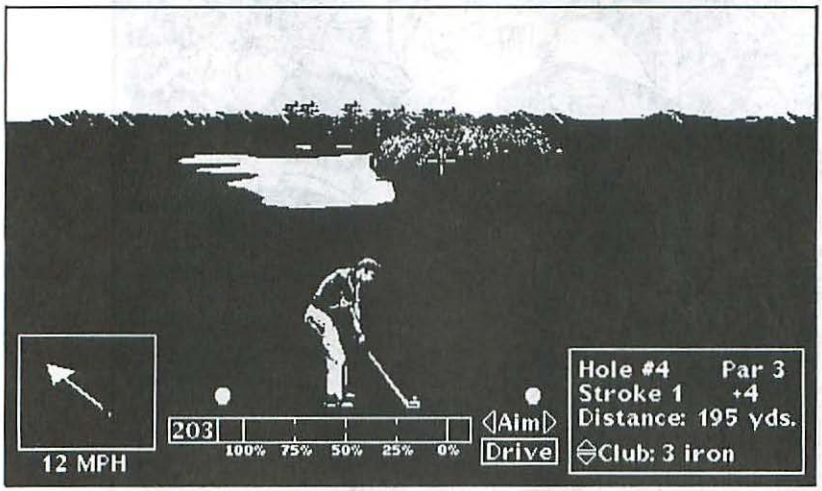
gossip/ trivia

[What a perfect opportunity to share the only joke I still tell from when I was twelve years old. Someone says, "You're driving me crazy!" and you say, "That's not a drive—that's a putt." —AN]

important warning

Although the game is System 7- and MultiFinder-compatible, you should close all other programs and consider turning off all your extensions. Otherwise, while executing shots, there's often a delay between a click and when it registers. There's nothing quite like seeing

what should have been a beautiful drive veer into the tall grass because of a jerky response to your clicks.



The game requires at least a Plus and 1MB of RAM (2MB for color) and System 6.0.5 or later. As with most Electronic Arts games, you have to verify ownership each time you launch the game, by looking up information in the manual. Lose the manual and you can kiss the game good-bye.

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Chapter 17

Communi-cations

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Telecommunicating

telecommunicating on the Mac (AN/DC)

Telecommunications (transferring information between computers over telephone lines) has a reputation for being one of the least friendly areas of personal computing. That's because, all too often, it *is* one of the least friendly areas of personal computing. But telecommunicating can also be tremendously exciting, useful and fun. If you get the right software, it can even be easy to learn—especially on the Mac, where it tends to be easier than on other computers.

You can telecommunicate directly with a friend's computer (it usually makes little difference whether it's a Mac or PC, or even some other kind of computer) or indirectly, through a computer provided by an *online service* or *bulletin board* (both described in their own section below). When you use an online service or bulletin board, sending a file to the distant computer is called *uploading*, and retrieving a file from the distant computer is called *downloading*. When you're connected to another computer on a phone line, you're said to be *online*, and *online* is also used to describe the things you find there—e.g. *online help, an online database.*

telecommunications basics (SA/AN/JK/SS/SH/ND)

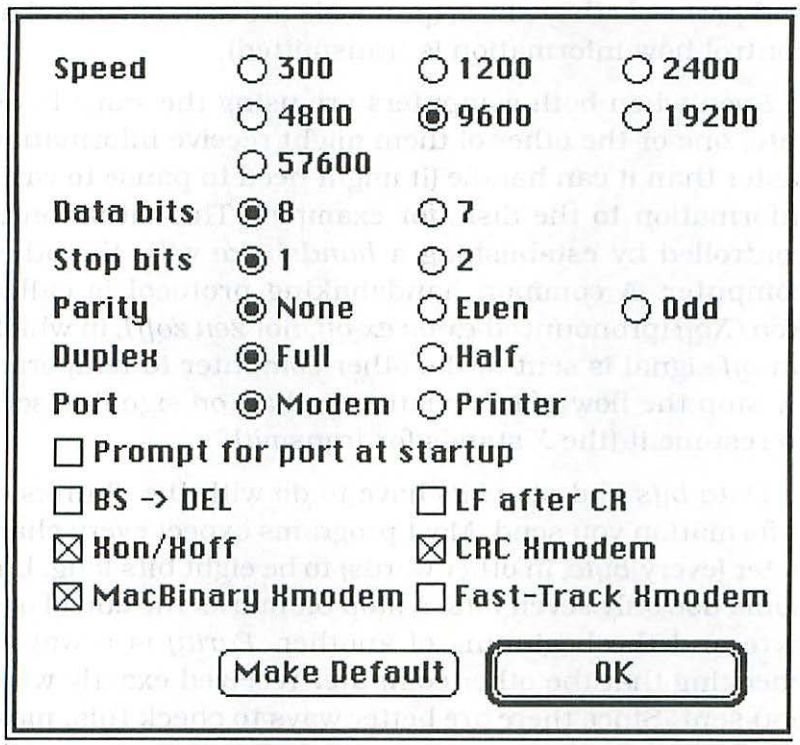
To telecommunicate, you need a *modem (MOE-dum).* This small piece of hardware lets you hook up your computer to a phone line and transmit data over it. The name is short for *mo*dulator-*dem*odulator; on the sending end, it *modulates* (changes) your computer's digital information into sounds, which then travel over telephone wires; on the receiving end, it changes the sounds back into digital data again *(demodulates* them). Like hard disks,

modems can be either external or internal (installed in expansion slots). External modems take up desk space and require a separate power supply. Internal modems cost more, lack indicator lights that show what the modem's doing and are difficult to install in anything other than a Mac II or Quadra. (There's a whole section on modems below.)

Hooking up an external modem is a cinch—there's a power cord to plug it in, a cable to connect it to the computer and a jack that connects it (by means of a regular telephone wire) to the phone jack in the wall. Since many people use a single phone line for both the modem and a phone, there's a second jack on the modem to hook the phone into. (But it's a real luxury to have two lines.)

In addition to a modem, you need *communications software.* It controls variables like the rate at which the modem transmits data, and tells the modem how to dial out and receive calls. Communications programs can be general-purpose or they can be adapted for a specific job, like the software that's designed to connect you with America Online (described below) and that's provided by them as part of their package.

The bad news is that most telecommunications terms are carry-overs from the less friendly days of early computers. Even the bare-bones program FreeTerm has a dialog box that looks like the one below (the good news is that, with the exception of the *speed* setting, you can usually just leave the default settings suggested by your program and everything will be fine):



The speed setting determines the rate at which the modem sends and receives information, usually called the *baud rate* (after the communications pioneer Baudot) and expressed in bits per second *(bps).* Most modems are capable of handling their own top speed as well as anything below that, so a 9600-bps modem, say, can transmit at 9600, 2400 and 1200 bps.

To give you a general feeling for these speeds, a 2400-bps connection will transfer about 12K per minute, a 1200-bps connection about 6K a minute. (In our experience, a 9600-bps connection transfers data only about three times as fast as a 2400-bps connection, perhaps because line noise affects higher-speed transfers proportionally more than lower-speed ones.) When two modems connect, they negotiate to determine the highest baud rate

and *protocols* they share (protocols are sets of rules that control how information is transmitted).

Even when both computers are using the same baud rate, one or the other of them might receive information faster than it can handle (it might need to pause to write information to the disk, for example). This situation is controlled by establishing a *handshake* with the other computer. A common handshaking protocol is called *Xon/Xoff* (pronounced *ex-on ex-off*, not *zon zoff*), in which an *off* signal is sent to the other computer to temporarily stop the flow of information and an *on* signal is sent to resume it (the *X* stands for *transmit*).

Data bits and *stop bits* have to do with the chunks of information you send. Most programs expect every character (every *byte*, in other words) to be eight bits long, but some use only seven bits. A stop bit marks the end of one byte and the beginning of another. *Parity* is a way of checking that the other computer received exactly what you sent. Since there are better ways to check this, most telecommunications transmissions use no parity at all.

You can telecommunicate in *real time*—which means that what you type appears on the other person's screen as you type it, and vice versa. (Most communications programs let you store everything you see on the screen to disk, so you can review it later.)

You can also communicate in real time with a bulletin board or online service, where there's no human on the other end but everything you send and receive still appears on the screen. But most telecommunications involves *file transfers*—something goes directly from your disk to the other computer, or from the other computer to your disk, and you don't see anything on the screen except a report as to the status of the transfer (how much time is left until it's finished, and/or how many bytes have been transmitted).

The most common protocol for transferring files with another personal computer (rather than with an online service) is *Xmodem*. *Ymodem* is essentially the same, but can send a group of files all at once; *Ymodem-G* is faster, but more precarious (any problems and the transfer gets cancelled); *Zmodem* is the best—both dependable and very fast.

Some communications programs include a basic programming or scripting language that lets you automate your telecommunications sessions. The next entry describes one of them.

MicroPhone *(AN)*

I used to hate telecommunicating for the same reason I'd hate trying to communicate in Urdu—I simply didn't know the language. That's why I like MicroPhone (from Software Ventures). It translates a lot of telecommunications jargon into English and makes it possible for me to do what I need to without a lot of effort. (Now if I could only find a good Urdu grammar.)

MicroPhone II has a lot of power (it should, for $300). It works in the background and supports transmission protocols like Zmodem that can greatly increase file transfer speeds. The current version is MicroPhone II 4.0 (I guess they like the *II* and plan on keeping it forever).

MicroPhone walks the thin line between maximum power and maximum user friendliness. Both strengths are obvious in its script feature, which records your every move in a short program you can then install on the menu as a command, as a button at the bottom of the screen, or both.

For example, you can devise a very complex script that calls several bulletin boards and online services in the middle of the night (when rates and usage are low) and uploads and downloads files based on any number of

contingencies. To initiate this flurry of activity, all you have to do, once the script is written, is click on a button or choose a command from a menu.

White Knight *(SH)*

White Knight ($140, from FreeSoft) pays no attention to the balance between power and friendliness—it chooses power every time. The program started life as the shareware hit, Red Ryder, and continues to be popular among expert users.

White Knight's best asset is its scripting language, which lets you create very quick automations of communications procedures. You can even create buttons to run the scripts. The program's downside is its complexity. From the moment you open it, you're faced with a bewildering array of options. That versatility lets expert users do everything they want, but it stymies novices.

FreeTerm *(Chris Allen)*

FreeTerm, by Bill Bond, is a simple, free communications program for Xmodem file transfers and for connecting with BBSs and online services. Many user groups have been recommending FreeTerm for beginning users since the mid-80s. No macros, no fancy emulations, no graphics—just a good, basic program.

[I've used FreeTerm for some time and have never felt anything lacking—until I found out how much phone time I could save using the Zmodem protocol, which is available with ZTerm (see the next entry). I still prefer FreeTerm's clear, simple interface, though, and Xmodem lets you connect to more people's computers than Zmodem does.—JK]

ZTerm *(RS)*

MicroPhone may be considered the standard communications program among those for whom money is no

object, but for shareware users, ZTerm is the software of choice. It's inexpensive ($30 registration, or $40 to have the author send you a copy), fast (it uses Zmodem and supports all baud rates), compact (about 250K—compared with over a meg for a basic MicroPhone II setup!) and complete (it includes simple scripting, a clock to keep track of how long you're telecommunicating, etc.).

ZTerm leaves out bells and whistles you don't need, yet does some things better than even the most expensive communications programs—for example, it's excellent at handling ANSI graphics and PC-based bulletin boards, which the others only recently seem to have figured out. Version 0.9's documentation makes it easy to set the program up for your needs (the hardest part of communicating with a modem).

ZTerm is a bargain, and it may be all you ever need in a communications program.

garbage (SA)

Intermittent garbage (bizarre characters that have no apparent meaning) on the screen when you're communicating with another computer usually means you've got a noisy phone connection. If you're just typing messages back and forth with someone, don't worry about garbage as long as you can read through it. But if you're transferring files, hang up and try again for a cleaner connection. Dropping the baud rate (from 2400 to 1200 or even down to 300) sometimes helps too.

If you're getting nothing but garbage on the screen, it may be because you and the computer you're connected to are trying to communicate at different baud rates. Most programs let you change the baud rate right in the middle of a session, so try that and see if it eliminates the garbage.

✎ *disabling Call Waiting* (DC/JK/AN)

Call Waiting—the phone company service that interrupts calls with signals when someone else is calling, and lets you switch between the two calls—disrupts data transmissions. But if your phone company uses electronic switching, you can temporarily disable Call Waiting for the duration of any outgoing call. Just precede the number you're dialing with **70,* (on a tone line) or *1170,* (on a pulse line). When the call is over, Call Waiting returns automatically.

To see whether you can do this on your phone, just try putting the appropriate code in front of a number you're dialing. If the service isn't available, you should get a recorded message that the call can't be completed as dialed.

If you're using an AT-compatible modem, add **70,* to whatever number it's set up to dial in your communications software. When you tell the modem to dial, it'll disable Call Waiting, pause for a second or two to allow the dial tone to return, then dial the phone number (the comma after **70* generates the pause). You can get the same result by typing *ATDT*70, phone number* into your software's command window (needless to say, substitute whatever number you're dialing for *phone number).*

✎ *the denser, the faster* (ND/JK)

You can speed your file transfers by first compressing the file you plan to send. There are commercial and shareware compression programs to choose from, and AppleLink (Apple's online service) even has one built-in. (For details, see the section on compression utilities in Chapter 7.) File compression can also be useful for keeping your data intact—if, for example, you're sending Nisus files over America Online, which normally trashes them.

Modems and fax modems

modem speeds, protocols and standards *(JK)*

When you buy a modem, make sure it's compatible with the industry-standard Hayes AT command set (with which your Mac controls the modem). A modem may also have its own protocols (in addition to the ones you set up in your communications software) which can enable you to send and receive data *much* faster and more accurately—provided the modem you're connecting to adheres to the same protocols.

Standards, each of which may include more than one protocol, cover three aspects of transmission—speed, error-checking and data compression. Their names begin with *V.* followed by a number (and sometimes the word *bis* or *ter*, which are French for *second* and *third).* Here's a guide to speed standards:

speed	*standard*
2400 bps	*V.22bis*
9600 bps	*V.32 compliant (just compatible isn't enough)*
14,400 bps	*V.32bis*

V.42 isn't a speed standard but rather an error-correction standard, and comes in conjunction with speed standards. (V.42 includes the MNP 2, 3 and 4 and LAPM protocols.) For data compression, look for V.42bis—it compresses data by a factor of four, so a 2400-bps modem can transmit at the equivalent of 9600 bps, and a 14,400-bps modem at the equivalent of 57,600 bps. (Don't use compression utilities like StuffIt and Compact Pro on your file before transmitting with V.42bis; it's unnecessary and may even slow down the transmission.)

It's wise to pick a modem that also has the MNP 5 protocol; it's compression ratio is only 2:1 but it's more common than V.42bis. (As with compression software, the actual amount of compression depends on the file type—text and some graphics files shrink the most.)

Inexpensive high-speed modems, a couple of which are reviewed below, were just being introduced as we finished writing this book. We'll review more of them in our free updates.

❦ *a networkable modem* (JK)

In offices that have a network of Macs, it doesn't make sense to buy a modem for everyone on the network; instead, just get Shiva's NetModem, which everyone can share the way they probably already share printers and file servers. The NetModem comes in three versions: 2400 bps ($500), 9600 bps ($1200) and a 14,400-bps Ethernet version ($1700) that supports V.32bis, V.42, V.42bis and MNP 5 (the 2400- and 9600-bps models don't support these).

You set up a NetModem the way you would any piece of networked hardware, like a laser printer, and add the necessary software to each Mac that will be using it. Of course, only one Mac at a time can use it, so if it's really in demand, it may make sense to get another phone line and a second NetModem.

You can also dial in to a NetModem from another location and use the distant file servers, printers and file-sharing Macs just as if your Mac were part of that network—they all show up in your Chooser. To actually work on files across the phone line, you need at least the 9600-bps model, and even then it's generally better to just transfer files onto your own Mac and work on them locally.

We've relied on the NetModem at Goldstein & Blair for countless file transfers, and have only had trouble once, when a print job apparently interfered with a long file transfer and network connections temporarily went down.

(You can get pieces of the NetModem's capabilities from other products—see the entries on *serial servers* and *AppleTalk Remote Access* in the *Networks* section of this chapter.)

ten million volts calling *(AN)*

As we pointed out in Chapter 2, lightning can hit a telephone pole, come down the wire, pass through your modem and fry your computer (and the modem too, of course). If you live in an area where there are a lot of thunderstorms, it's a good idea to disconnect the incoming phone line from your modem when you turn the system off. (Since lightning hits power poles too, it's also a good idea to pull the plug of your computer's power cord out of the wall socket.)

fax modems *(SS/JK)*

More and more modems come with fax capability, which lets you use your Mac to send—and often receive—faxes. (The fax modem's software converts your Mac documents to fax format and sends them over the phone line, to either a fax machine or another fax modem.)

As long as your Mac and modem are on (and the fax modem software is installed), receiving a fax is automatic; incoming faxes are stored on disk, and software lets you know they're there. Fax software usually comes in at least three parts: a Chooser driver for sending faxes, an extension or control panel for receiving them and an application for viewing faxes you receive, maintaining a phone directory, setting preferences and so on.

Dove FaxModem+ *(AN)*

New Shimmer is a floor wax.

No, New Shimmer is a dessert topping.

It's a floor wax!

It's a dessert topping!

Hey, hey, calm down, you two. New Shimmer is a floor wax and a dessert topping.

As in the famous *Saturday Night Live* spoof, the Dove FaxModem+ is a modem, a fax machine *and* an answering machine. This is a wonderful idea for a product (even better than New Shimmer). But I could never get it to work right.

When you install the Dove software, it metastasizes all over your disk, putting strange little files in the weirdest places. It crashed my system and corrupted the System file so that I had to reinstall it, which was an incredible pain, since I was out-of-town and didn't happen to have another system on floppies (it crashed Susan's machine as well). When I finally got my Mac up and running again, and the Dove software installed, I still couldn't get the modem to send a fax.

Dove FaxModem+ is incompatible with zillions of things; in fact, the Read Me file for version 2.03 listed problems—some minor, some major—with 75 products! Now, it's commendable to find and list as many incompatibilities as you can, and I hate to nail Dove for doing such a diligent job of it, but this product's list of incompatibilities is truly staggering—even if they are mostly due to bad programming on the part of other companies.

Fortunately, there seem to be some other fax modems that aren't so finicky (although I won't believe that until I try them myself).

text quality with fax modems *(SS)*

Mac bit-mapped fonts have a resolution of 72 dpi, and most fax machines have a resolution of about 200 dpi. Fax modem software has to make the conversion, by trying to find a Mac font that's three times the size you used in your document and then scale it down. (This is the same process used to print bit-mapped fonts on

non-PostScript printers.) If the appropriate font size isn't installed, you'll get jaggies on large type sizes and small ones will look like smears.

You can avoid this problem by using TrueType fonts, or PostScript Type 1 fonts and ATM. (Because System 6 users usually don't have TrueType fonts, some fax modems come with large sizes of Times and Helvetica, and sometimes Courier and Symbol.)

shopping for a fax modem (SS)

When deciding on a fax modem, don't just look at price, speed and output quality. Here are some other things to consider:

- Besides text quality, background operation is the most important software feature. Without it, your Mac will be tied up whenever it sends or receives a fax.
- Some fax modems, like Abaton's InterFax 24/96, automatically switch between fax and data modes, depending on what you're doing; others you have to tell what mode you want.
- If you'll primarily be sending rather than receiving faxes, you can save money by buying a send-only fax modem.
- All fax software lets you create a directory of frequently-called fax numbers, but some let you keep multiple directories, or set up distribution lists, which allow you to fax a document to an entire group (your company's sales reps, for example), while others only let you keep a bare minimum of information.
- If you don't want to make a new cover page for each outgoing fax, choose a program that makes them automatically. This saves a lot of work when sending the same document to a group.
- If you'll be sending blueprints, CAD documents or anything else that must not be rescaled, you need fax software with an *Exact Size* option.
- Most programs let you set up fax transmissions in advance, so they'll transmit automatically when phone

rates are lower or the receiving fax machine is on and ready to receive faxes.

- When the fax machine you're trying to send to is busy, it's convenient to have your fax modem redial automatically until the connection is made.
- *Polling* lets you dial another fax machine or fax modem and have it send documents to your modem. You'll need this to take advantage of the automatic information-faxing services some companies offer their customers.
- Most software includes a fax log that keeps track of faxes sent and received. Log reports vary in the amount and clarity of information recorded.
- The *View* function allows you to read incoming faxes on-screen—without printing them—and then toss them away.
- Some programs let you control a scanner directly from the fax software, so you can scan in a paper document that you want to fax. Otherwise, look for software that can convert the scanned files to fax format.

Supra's V.32bis fax modem *(SS)*

Supra's V.32bis fax modem ($480 with cables and software) is one of the first modems to offer 14,400-bps data transmission *and* 14,400-bps fax capability at an affordable price. In addition to the usual indicator lights, this modem has an LED display panel that tells you when the modem is dialing, the connection speed, and the protocols and standards used in the connection (it supports V.42, V.42bis and MNP 5).

The Macintosh package also comes with a stripped-down version of MicroPhone and FaxSTF fax software. I wasn't a fan of earlier versions of FaxSTF, but it's improved a lot. In addition to the normal fax features, it lets you add new phone book entries on the fly and comes with a DA you can use to quickly compose short faxes.

FaxSTF still doesn't rate high in convenience, though. It includes an application, two DA's, a Chooser extension, a system extension and a control panel—with so many components, it's hard to remember which part does what. To make matters worse, functions like turning the fax software on and off are handled by the Chooser extension, which is neither convenient nor intuitive.

Some users report that the V.32bis drops the connection or the baud rate too easily when connecting at 14,400 bps over a noisy phone line, but Supra has announced upgrades that may fix this problem. At this writing, it's the best modem bargain around, and it's backed by Supra's five-year warranty.

fax abuse *(AN)*

With faxes becoming ubiquitous, a dreadful new epidemic stalks our fair land. I refer, of course, to fax abuse.

You know how much you hate being called on the phone by people trying to sell you things? (I always tell them, "I'm kind of busy right now. Give me your home number and I'll call you back later." When they demur—as they always do—I say, "In other words, you feel it's OK to call *me* at home to sell me something, but you don't want me to call *you* at home to buy it?") Well, a new breed of equally loathsome sleazeball has started sending ads, press releases and the like to fax machines.

I recommend responding to each instance of fax abuse as we do at Goldstein & Blair, with a return fax that reads:

> Dear Fax Abuser,
>
> You owe us $5 for using our fax to send us your [publicity materials/ad/whatever]. If we don't receive a check for $5 from you to cover this, or if you ever do it again, we'll never [buy/review/use] any of your products again.

Keep a little log of fax abusers and be true to your word. Now's the time to nip this vile trend in the bud. If we don't act quickly and decisively, our fax machines will soon be as clogged with junk as our mailboxes.

Online services and bulletin boards

online services *(AN/SH/ND/Michael Miley)*

mostly for beginners

Online services operate large computers that you access with a modem over phone lines. Their computers store software, documents, messages and other electronic information that has been uploaded *(posted)* by computer companies, by the people who work for the online service and by other subscribers like yourself, so that it's available to be downloaded. In other words, an online service is like a warehouse and package delivery service for information in electronic form. In addition, online services let you *chat*—type back and forth in real time with other users.

There are many commercial online services, but America Online, AppleLink and CompuServe (all described in more detail below) are particularly valuable for Mac users. They have tons of public-domain Mac software and shareware, and software publishers often post minor upgrades on them (ones that fix bugs or improve compatibility).

GEnie is another online service that has a good library of Mac shareware, but its user interface is confusing and unMaclike. (Not surprisingly, services that were originally created for Macs, like AppleLink and America Online, are a *lot* easier to use than ones that were originally created for PCs, like CompuServe and GEnie.)

Online services provide *conferences* (where a number of users chat on a given topic) and *forums* (sections of the online service that include software, messages and

conferences in a particular area of interest). In addition, online services often offer syndicated news stories from AP and Reuters, job listings, stock quotes and financial information for investors—usually at an extra charge. Some will even send faxes for you, for about what you'd pay at a service bureau.

e-mail *(CR)*

mostly for beginners

Anybody who has a computer and ever needs to send messages or files to anybody else with a computer should know about *e-mail* (the name is short for *electronic mail).* Once you realize you can transfer information in a few minutes instead of a few days (or for a few pennies, instead of for what Federal Express costs), you'll be hooked. Some online systems, like MCI Mail (reviewed below), pretty much just do e-mail; others, like AppleLink and America Online (also reviewed below), have many other features as well.

[Because I dread having another thing to do each day, I used to avoid online services. I was afraid that if I had e-mail addresses, people would send me messages and then be offended when I didn't have time to respond (I can't even get around to answering regular snail mail). But to transfer the chapters of this book back and forth, our editors and contributors used e-mail extensively—in fact, without e-mail, this book would barely have been possible.

A big advantage of e-mail (particularly if you tend to work odd hours, as I do) is that other people don't have to be around (and awake) when you upload something to them, or download something from them, and you don't have to be around and awake when they upload or download things—which isn't the case, of course, if you're communicating directly between your personal computer and theirs. (Direct connection is much easier if you each have two phone lines, while that's not as much of an issue when you're using an e-mail system.)—AN]

AppleLink *(SH/ND/JK/AN)*

AppleLink, Apple's own online electronic mail and information service, was originally just for Apple employees, dealers, developers, user groups and universities, but now it's available to anyone who can afford it. It costs $70 to start an account, plus $12 an hour for connect time, with a $12 minimum per month. Then there's the charge for sending messages or uploading or downloading files: 5½¢ per kilocharacter (roughly 1K) from 6 am to 6 pm, and 4½¢ cents the rest of the time. And that's just for AppleLink's 2400-bps lines—if you connect over one of their 9600-bps lines, you're billed a flat rate of $37 an hour. (Ouch.)

very good feature

For the money, you get a well-designed program that automatically compresses the files you send and hangs up quickly if you walk away from the computer while you're logged on. AppleLink's users tend to be sophisticated Mac users and developers from all over the world, and there's lots of useful, up-to-date technical information, product announcements and price lists (for third-party stuff as well as Apple products).

Since the bulletin boards are run by Apple employees, their information comes right from the source. (There's info on Apple IIs as well.) But AppleLink doesn't have the variety of forums and the enormous shareware libraries of America Online or CompuServe.

If you use the educational network Bitnet—or any system connected to Usenet—you can leave messages for people on AppleLink by putting *@applelink.apple.com* after their AppleLink address. So to reach us, for example, you'd type *Mac.Bible@applelink.apple.com.*

America Online *(AN)*

America Online was originally designed as a version of AppleLink for people who weren't eligible for a regular

AppleLink account. It's evolved into a large, Mac-and-PC online service, and a very inexpensive one at that: the rates are currently $10/hour prime time, $5/hour other times, with a $6/month charge that includes one hour of nonprime time (and the rates are even cheaper than that if you join through a user group).

America Online offers a lot of value for the money. It has a great shareware and freeware collection, and has become very popular with Mac users—which means someone you want to send a file to is more likely to have an account on it than on, say, AppleLink. For these reasons, if you only use one online service, AOL is probably the one to get. But it has a number of annoying defects, and I find them maddening enough that I personally use AppleLink whenever I can.

Version 1 of America Online's software didn't recognize tabs, em dashes, curly apostrophes or curly quotes (which was very annoying) but version 2 handles them just fine in e-mail messages and memos. It even lets you mix fonts, sizes and styles in memos and e-mail, something the curent version of AppleLink can't do.

America Online also seems to transmit data more slowly than AppleLink, or perhaps it just estimates that transmissions will take longer. (Some tests Nancy Dunn did seem to confirm the latter hypothesis.) *[In my experience, both AppleLink's and AOL's estimates can be wildly inaccurate.—JK]*

Both AppleLink and America Online screw up regularly, but AOL seems to do it more frequently, at least in my experience. Its lines tend to be busier and I find its software much less user-friendly. I've seldom been confused on AppleLink, but it's happened on AOL frequently.

[I like America Online, but I've found that it strips the formatting out of Nisus files when they're uploaded or downloaded, unless they're compressed by a utility like Compact Pro beforehand. When you send Nisus files using AppleLink, they come through intact, whether or not they were compressed.—JK]

There's now a Macintosh Bible/Peachpit forum on America Online (click on the *Departments* button, then on the *Computing & Software* button, then on our icon). The Macintosh Bible Software Disks, described at the end of Chapter 20, include the America Online software and five free hours of connect time.

America Online bis *(ND)*

I like America Online because, like AppleLink, it's easy to use and has a graphical, Maclike interface. Using other online services (and most BBSs) is like entering an alien world where arcane commands are needed even to exit the system.

But during the preparation of this book, I ran into enough problems using America Online (system hangs, mainly) that I began to distrust its reliability. (Version 2 took a long while to come out, but I haven't had any trouble since installing it.) I also found their technical support inconsistent and often a bit amateurish.

I wasn't sure how long AOL would let me stay connected without any signs of life from my Mac, so I tested it. It took 34½ minutes before a dialog box showed up to ask me whether I wanted to remain online. When I didn't respond, AOL waited 5¾ minutes more before disconnecting me—a total of just over 40 minutes.

This was in the hours approaching midnight, when the system is heavily used, so it might take less time for the system to notice inactive sessions at other times—but their own people later told me that automatic disconnects can

take as long as an hour! If you tend to get distracted, you can tell the software to disconnect after it finishes sending or retrieving mail, but you don't have that option when you're downloading files from America Online's bulletin boards.

thanks for sharing *(JK/AN)*

If you want to correct errors in this book, or if you have a tip you'd like to see in the updates or the next edition, send us a note on America Online (at *Mac Bible* or c/o the *Macintosh Bible/Peachpit* forum), on AppleLink (at *Mac.Bible*—AppleLink doesn't believe in spaces) or by snail mail (Goldstein & Blair, Box 7635, Berkeley CA 94707).

With three hundred billion *Mac Bibles* out there (or something like that)—and hoards of crazed fans camped outside our office, and police on duty round the clock just to get us safely into our limos—we don't have time to respond individually, but we do read what you send and consider it carefully.

CompuServe *(JK/DC/ND)*

CompuServe is a very popular online service for both Mac and PCs; it offers a great shareware library and access to more information on more subjects than any other service, including professional journals, encyclopedic databases and online forums (some of which you have to pay extra for). But its interface is non-Maclike and many Mac users can't bear to deal with it.

CompuServe's rates vary, depending on which services you use. The basic connect charges (billed by the minute) are $13 an hour at 2400 bps and $23 an hour at 9600 bps, no matter when you call. But for a flat fee of $8 a month, you can get unlimited free access to CompuServe's basic services (like news resources, e-mail, shopping and travel reservations) and only incur the hourly rate when you enter areas like the online forums or software library.

There's also an executive services option available for a $10 monthly minimum charge that allows access to more information databases and professional journals.

To register, you need to buy a CompuServe Starter Kit; it's available at most computer stores for about $40. The kit includes a list of available phone numbers, a log-in code, and instructions for signing up. You'll also need a major credit card for billing.

Navigator *(PH)*

If you use CompuServe, and don't want to have to think while the meter is ticking, CompuServe's own $170 Navigator program gives you a quick-and-easy method for getting the messages in all the conferences you want to browse; you then disconnect and look at them at your leisure.

You can answer the e-mail messages you want to respond to and create new ones, run Navigator again and have it send all of your responses to the right places in a single step. This sounds like it will save you money but it won't—since using Navigator is so easy, you'll find yourself signing up for many more conferences.

Prodigy *(SA/JK)*

Prodigy is an online service sponsored by Sears; there's a special version of the software for Mac owners. Despite its name, Prodigy is no *wunderkind*. It won't run in the background, the menu isn't available when you're in it, and it's *slooooow*. Even worse, the bottom of your screen is reserved for ads—for things like mouthwash!

Prodigy does have at least one valuable feature: you can look up politicians' biographies and voting records, and the campaign contributions congressional and presidential candidates have received. But access to this information alone doesn't make Prodigy worth signing

up for, even though it's cheap (a flat fee of $13 plus tax per month).

MCI Mail *(CR)*

MCI Mail lets you send e-mail to other MCI Mail, CompuServe or Telex users (as well as several other systems); it also will convert your computer messages to paper and have them delivered overnight or by regular USPS snail mail (the advantage in that case being that the letter starts off in the destination city rather than where you live, which gives it more of a fighting chance). Even better, you can have your messages printed out on any Group 3 fax machine in the world (for 50¢ for the first half page and 30¢ for each additional page).

Most users' addresses are based on their names (mine is *CRubin).* You can create and store address lists and then select groups of people to receive your messages en masse. You can type messages in online or use a text editor to create them before you send them, but the editor's pretty crude—you're better off deleting your draft and starting over again.

Aside from a yearly fee of $35, the only fees are for sending messages or accessing special services (described in the next paragraph). Receiving mail and simply checking for it is free (as is the phone call, since you connect with MCI Mail over an 800 number). Sending a message costs from 45¢ (for up to 500 characters to $3 (for 15,001–22,500 characters).

As I write this, 2400 bps is the maximum baud rate MCI Mail supports, but soon you should be able to connect at 9600 bps (although it may cost you more). You can also use MCI Mail to access the Dow Jones News/Retrieval database. This costs from $12 to $72 an hour extra, depending on the database you read and the time of day you read it. But MCI Mail is primarily designed to make sending e-mail very easy (which it does).

saving time and money online *(SA/JK)*

Here are four things you can do to make your online sessions more efficient:

- Although many services have higher hourly fees for higher baud rates, you should still use the highest baud rate your modem can handle when sending or downloading files. Few services charge twice as much for a 9600-baud connection as for 2400-baud one, even though transmissions take less than half the time.
- If your communications software lets you create scripts, or otherwise automate online procedures like posting and retrieving messages, use that capability. Scripts run faster than you can work in real time.
- Prepare your messages and files offline. Why pay for online time when all you're doing is writing?
- If you have to interrupt your work while online, try going into a customer-service or help area; the hourly charge is usually waived there. You'll save yourself the time and trouble of logging on again, without paying for the connect time (but if you're away *too* long, the service may hang up on you).

communicating between services *(Michael Miley)*

Most online services provide *gateways* (bridges) to other online services through the Internet, which links networks and online services around the world. A gateway won't allow you to access another service's features, but it will let you send a message from an account on, say, AppleLink to one on CompuServe or vice-versa.

To get through the gateway, your mail has to be addressed in a way that tells the Internet which system to forward it to (for an example, see the end of the AppleLink entry above). Check with your online service to find out if anything else is required, and whether there are any special fees involved.

If you have an in-house e-mail system, you can even install a gateway on your own server. Before you choose one, find out whether it lets you send complex Mac files without losing their data en route.

e-banking *(Michael Miley)*

If you're tired of writing checks, addressing envelopes and licking stamps to pay your bills, check out CheckFree, which lets you pay them all by modem. CheckFree lets you build a list of accounts and contact information, then fill in your deposits, debits and credits in a general checkbook ledger. You can pay certain accounts automatically each month and others only when you make a payment request (you have to make the request at least four days in advance of the pay date, though).

CheckFree costs $30 for the software plus $10 a month for the service, which covers your first 20 payments. Additional payments are $3.50 for each ten (or portion thereof). For more complete check management, look into Managing Your Money ($90 from Meca Software—see Chapter 12 for details). It also lets you access the CheckFree service.

bulletin boards *(DC/SA/AN/SH/JK)*

An electronic *bulletin board* (abbreviated *BBS*, for *bulletin board system)* is sort of a home-grown, low-rent online service. It's a lot like an electronic user group—you'll find plenty of people online who are willing and able to answer your questions. Most bulletin boards also have the latest versions of public-domain and shareware software available for downloading (the sections of online services that do that are also sometimes called *bulletin boards).*

Best of all, most BBSs are free. (But with a commercial online service—unlike a BBS—you virtually never get a busy signal. If you need information or software right away, that may be worth some money to you.)

The person who runs a bulletin board is called a *sysop (SISS-ahp,* for *system operator).* On small bulletin boards, the sysop does everything—takes care of the hardware, decides what's available for downloading, controls who's allowed to leave and retrieve messages, and so on. On bigger boards (and on online services), sysops control sections that are dedicated to specific kinds of information.

A complete list of every active Mac BBS in the country would take up many pages of this book and would probably be out of date by the time you read it. Here are four we can recommend, along with their fees, if any, and the maximum baud rate they can handle.

- 4th Dimension (adventure-style BBS). Cambridge MA, 617 494 0565. No access fee. 9600 bps. Sysop: Zeff Wheelock.
- Laserboard New York. Queens NY, 718 639 8826. $18 a year. 14,400 bps. Sysop: Adam Wildavsky.
- MacInfo. Newark CA, 510 795 8862. No access fee. 9600 bps. Sysop: Norm Goodger.
- SoftArc Online. Scarborough, Ontario, 416 609 2250. No access fee. 9600 bps.

Some BBSs offer gateways to other bulletin boards (that is, you can call one board and access others thru it—post and pick up messages, for example—without having to make another call). Thousands of individual BBSs around the world have linked together to form FidoNet *[after the founder's dog?—AN]. The BMUG Guide to Bulletin Boards and Beyond* ($20, or $15 for members) explains how to access the BBSs that are part of FidoNet, and even can help you start your own BBS.

Networks

networking basics *(Rich Wolfson/SH/JK/AN)*

mostly for beginners

A computer *network* is two or more devices connected to share information (so, technically, a single Mac hooked to a LaserWriter is a network, although it's seldom called one). Among Mac users, *network* usually refers to a *local area network*, or *LAN*—one that's confined to a relatively small area, like an office.

Some complex *wide area networks* (abbreviated *WAN* in writing, but seldom in speech) contain thousands of devices from varied manufacturers communicating with each other directly over *dedicated* cables (i.e. ones used for that purpose only) or phone lines, and indirectly via modems or even microwaves.

Every device on a network (whether a computer, a printer or whatever) is called a *node*. Every node has an *address*—a unique ID number. Each node on a Mac network automatically gets an ID number when you turn it on; the number varies from one time to the next, but it's always unique on the network.

Because of this, you don't have to halt the network to hook up additional nodes, and that makes Mac networks a cinch to set up. (PCs and most other computers need special, additional software to network, and on networks made up of them, ID numbers aren't assigned when you turn the node on. The Mac's capabilities are more advanced because it's had networking software built in since the beginning—even back when 128K was a lot of RAM and virtually nobody had a hard drive.)

very good feature

On Mac networks, you also give each node a name—using the Sharing Setup control panel on System 7 Macs, the Chooser on System 6 Macs, and the setup programs that come with other devices.Unlike the ID number, the

mostly for beginners

name stays constant, so you can identify the Mac whose files you want to share, the printer you want to use, etc.

Certain protocols tell each node what to do with the information flowing through the network. Most Mac networks use the AppleTalk protocol, because that's the software that's built into all Macs. Other protocols—sometimes used by Macs but mostly used by other machines—include DECnet, TCP/IP and Token-Ring.

Large networks are often subdivided into smaller areas called *zones* (which show up in the Chooser) so that users can narrow down their Chooser selections to, say, the Macs and printers in their own office's zone, rather than having to select from every device in the building. Separate networks can be connected by *bridges*, *routers* or *gateways* (in order of increasing intelligence). When networks are connected with one of these devices, each network is usually treated as a zone. Zones are just a convention to make things easier on humans; the computers don't need them. In fact, you could have many networks joined by routers but no zones (but if you did that, everyone on the network would have to choose from among thirty printers).

network configurations *(Rich Wolfson/AN/SH/JK)*

mostly for beginners

There are three basic network configurations (ways of connecting the nodes) commonly used on the Mac. *Daisy-chain* (also called *series)* networks connect devices one after the other, in a chain. (The problem with this configuration is that if one node is disconnected, so is everything beyond it.)

A *backbone* configuration is an improvement, because each node has its own little branch off the main cable (like rooms off a hall); if one node is disconnected, it doesn't affect the others. A *star* configuration has a central node to which all the other nodes are connected.

You can combine various configurations—for example, you might daisy-chain several nodes on one branch of a

star. Theoretically, AppleTalk networks can have up to 255 nodes, but networks of over 32 nodes are usually too slow to be practical. The only other limitation is that you can't link the first and last node together into a complete circle. That's called a *ring network* and requires special hardware that recognizes the TokenTalk protocols.

(On ring networks, electronic message packets called *tokens* circle ceaselessly. As they pass, each node grabs any information meant for it and loads any information it wants to send someplace else—unless the token is full, in which case the node waits for the next token. Ring networks have the same disadvantage as daisy-chains, only more so—one node going down can disrupt the entire network.)

networking hardware *(Rich Wolfson/AN/ND/JK)*

Apple's cabling and connectors for LANs is called *LocalTalk*. Not long after it was introduced, a small company named Farallon introduced an alternative to LocalTalk hardware called PhoneNet. It has several major advantages (and, as a result, Farallon is no longer small).

- PhoneNet uses regular phone wire, which costs about a third as much as LocalTalk cabling. You save even more if you use the two unused (yellow and black) wires in existing phone lines that probably already run where you want your network lines to go.
- PhoneNet connectors are also somewhat cheaper, $60 list vs. $75 for LocalTalk.
- PhoneNet's connectors are like the standard modular plugs on phone cords (LocalTalk connectors have a tendency to pull out).

- PhoneNet allows networks to run up to 3000 feet (LocalTalk limits you to 1000 feet).
- It lets you use daisy-chain, backbone or star configurations (LocalTalk restricts you to the daisy-chain).

If you have a network of any size, PhoneNet hardware can save you a lot of money, and imitations of it can save you even more. At the college where Rich teaches, they use an inexpensive and reliable PhoneNet clone, Trimar's CompuNet, which costs just $20 per connector, or $15 each if you buy ten or more.

(If you already have LocalTalk cabling, just switch over to PhoneNet-type hardware for any additional needs. Farallon makes an adaptor for connecting LocalTalk to PhoneNet systems, so you won't lose whatever you have invested.)

file sharing *(JK/CR/SH)*

System 7's file sharing allows Macs on a network to access each others' files. It's a great way to copy files from one Mac to another—much easier and faster than carrying floppies back and forth. You can also work on a file on another Mac without copying it to your own, but that generally slows down both Macs.

Your files are private until you turn on file sharing by clicking the *Start* button in the Sharing Setup control panel. Then you select a disk, folder or file you want to share and choose the *Sharing...* command from the File menu. In the dialog box that appears, you can set up *access privileges* for other users on your network, which determine whether they'll only be able to look at your files, or to make changes, rename, move or delete them.

If you want to assign different degrees of access to different users, you'll have to register each user's name (and give them passwords if you want) in the Users & Groups control panel. You can also organize users into Groups, so you can set access privileges for several of them at once. The File Sharing Monitor control panel lets you keep track of who's using which of your shared items.

To access shared files on someone else's Mac, you open the Chooser, click on the *AppleShare* icon, select the

Mac's name in the box on the right, and click *OK*. In the next couple of dialog boxes, you'll be asked to enter the name you were registered under and your password (if any), and to select the shared item you want to use. When you've clicked *OK* in the last dialog box, the shared item's icon shows up on your desktop, just like another disk.

In the same way, you can access your own Mac's hard disk—its complete contents, without restriction—from another networked Mac; just enter your *owner's* name and password (you entered them in the Sharing Setup control panel when you turned file sharing on).

Although only System 7 Macs can *share* their files, Macs running System 6 can *access* files on other Macs—all they need is the AppleShare workstation software, which comes on System 6 installation disks since version 6.0.4. To share files from a System 6 Mac, you need Public Folder (described below) or TOPS (described in the next section).

File sharing's main costs are that it uses up memory in the host Mac (the one that's sharing files) and slows it down. Here are a few tips on how to minimize that tendency:

- You can bypass most of the procedure for getting a shared item onto your desktop by making an alias of it once you get it there the first time. The next time, just double-click the alias and click *OK* in the dialog box that appears.

- You can share up to ten separate items, but unless you're setting up different access privileges for each of them, it's much easier to gather everything you're sharing into one folder and share *it*.
- The fewer people you share files with, the less time your Mac will spend responding to their requests instead of your own. Ask the people you share with to disconnect from your Mac as soon as they've copied the files they need, to free your Mac up.
- Share as few files as possible. The fewer files you share, the fewer opportunities there will be for someone else

to accidentally delete or rename your files—or see something they shouldn't.

- Use as little security as possible. You should be able to control access to your sensitive files by being careful which folders you share. As soon as you start creating users and groups and setting privileges for them, you'll find yourself tangled in a web of security that you'll constantly be asked to change. A lot of people will forget their passwords, and there's no place to look them up—you can only change them to new ones.
- If you do register users, make sure all owners of file-sharing Macs on the network register users with the same names. If someone named Margaret were registered as Meg on one Mac, Peggy on another and Maggie on a third, she'd have to remember which Mac had her set up under which name.

Public Folder *(Rich Wolfson/JK)*

Public Folder provides basic file-sharing capabilities to System 6 Macs. Available *free* from Claris if you've got one of their other products, and downloadable from most bulletin boards and online services, it allows anything that's placed in a root-level folder named *Public* to be seen and copied by any other Mac on the network (provided it has the Public Folder init running).

Transferring files is much faster with Public Folder than using a file server as an intermediary. But Rich's favorite use for Public Folder is to accomplish something that would otherwise be impossible with System 6 Macs—copying the contents of one hard drive to another.

Normally, you'd need a spare hard drive or file server for an intermediary transfer. With Public Folder, you just hook an ImageWriter cable into the printer port of both Macs and run Public Folder on both machines. With AppleTalk turned on in the Chooser, the machines can communicate with each other and each copy files from the other's Public folder.

file servers and AppleShare (Rich Wolfson/SA/SH/JK)

A *file server* is a computer on a network that everyone can access and get applications and documents from. Some file servers are *dedicated* machines; they might also take care of print spooling and e-mail for the network, but you can't sit down in front of them and use them as workstations.

AppleShare is Apple's file-server software, which can turn any Mac on a network into a dedicated file server. With AppleShare running, the file server's hard disk appears to everyone on the network as another icon on the desktop, with its own window, folders and files. AppleShare predates file sharing (described above) and has some similar security features; each file or folder can have an "owner" and only someone with appropriate access privileges can get at it. A network administrator can set up work groups with various levels of access privileges.

PCs can be connected to AppleShare with the PhoneNet Card/LocalTalk ($300) from Farallon. To the PCs, the server looks like another disk drive, and they can access the documents on it (not the applications, but what could they do with them anyway?).

We've used an SE/30 as an AppleShare server for years at Goldstein & Blair, sometimes under fairly heavy activity, and never had any major problems with it (major problems, yes, but not with *it*). Apple recommends using at least a II-family Mac as a server, but Rich has successfully used lesser Macs with beefed-up memory and large RAM caches.

SneakerNet (Rich Wolfson)

SneakerNet may be the most widely-used network. It's implemented by putting information onto a floppy disk (or even paper!) and walking it over to the person (or machine) you want it delivered to. SneakerNet sometimes

loses data and is often slower than you'd wish, but it's one of the cheapest networks available.

repeaters *(Rich Wolfson/SH)*

A repeater can extend an AppleTalk/PhoneNet network to as much as 6000 feet, by boosting the signals along the cabling. Install several, and you can go a long way.

Farallon's StarController ($1300 list) and similar devices are multiport *repeaters*—they not only amplify the signal as it passes through but allow multiple branches on a star network. Since each branch on an AppleTalk star network has its own 3000-foot limit (if you're using PhoneNet-type cabling), using a star repeater can really expand your system. It has two other advantages: by breaking a large network into smaller pieces, everything happens faster and more reliably; and if any part of the network has a major problem, only that part shuts down, making troubleshooting much easier.

EtherTalk/Ethernet *(JK/Rich Wolfson)*

Ethernet is one of the fastest networking systems available. A LocalTalk network can transmit data at 230 kilobits (about 5000 average-sized words) a second, while an Ethernet network can go as high as 10 *mega*bits (over 200,000 words) a second—more than 43 times as fast! (But be aware that most hardware can't keep up with that speed.)

Each Mac in an Ethernet network needs EtherTalk software, an interface card that costs $200–$425 list, and special cabling. (The card and cabling are called *Ethernet*, the software and communications protocols are called *EtherTalk*—or, sometimes, *AppleTalk over Ethernet.)* Traditional Ethernet cabling resembles the coaxial cables that connect VCRs to TVs, but now most Ethernet installations use twisted-pair wiring, which looks like telephone

wires and requires an Ethernet hub like Farallon's $1900 StarController EN. (Many networks that run off a VAX minicomputer already have Ethernet, and it's easy to connect Macs to them, individually or as a zone).

Several companies—including Apple, Asanté, Cayman, Dove, Farallon, Novell, NRC and 3Com—manufacture Ethernet cards. We use the Asanté and NRC cards at Goldstein & Blair, and the speed difference compared to LocalTalk is incredible. Except on large networks (or medium-sized ones with routers), the server's hard disk and computer are what limit your speed—using a file server over Ethernet is almost as fast as using a local computer.

routers *(JK/Rich Wolfson)*

Liaison ($400 from Farallon) is a software-only router that links AppleTalk networks, including those with different cabling systems (LocalTalk and Ethernet, say), thus allowing them to share resources like file servers and printers. Liaison also lets you organize a single network into zones, and lets you link networks (or single computers) at a distance, using just a modem.

At G&B, we used Liaison on our file server to link the EtherTalk zone of our network to the LocalTalk zone. It was easy to install and, for the most part, worked seamlessly in the background to make the network function as a contiguous whole. The Liaison manual is concise and informative, Farallon's tech support is knowledgeable and accessible, and their product works. It has provided us with a trouble-free means of sharing printers between the two zones in our office. (It also lets you dial in to a network from a remote Mac.) Here's some info on some other routers:

FastPath ($2800, from Shiva) was the first router of its kind, connecting networks through an intermediary Ethernet backbone. The current version, FastPath 5, can use

a variety of cabling and handles a variety of protocols, including TCP/IP. Cayman's GatorBox ($2800 list) has many of the same features, and also offers some functions that translate between AppleTalk and TCP/IP protocols, which make printing and file sharing easier. Apple's software-only Internet router supports up to eight ports simultaneously, and can run in the background. It supports both LocalTalk-only networks and extended networks that use EtherTalk and TokenTalk.

group editing software *(Michael Miley)*

Group editing programs let two or more people at different Macs on a network, or at remote Macs linked by phone, work on the same document (either simultaneously or at different times) and maintain a single, up-to-date, master copy of that document. One example is On Technology's Instant Update ($200–$250 per user, depending on quantity).

If two people are simultaneously editing the same paragraph (which means neither has the most current version), Instant Update can show both variants of the paragraph on both Macs, and allow the editors to choose which version to keep. But Instant Update lacks some controls that a full-fledged editing team might want, like the ability to compare old and new versions side by side before saving changes.

Group Technologies' Aspects ($130–$300 per user) adds group editing capabilities to a blend of graphics and telecommunications software. It lets several users on a conference call all see the same document (the floor plan of a building, say) on their Macs and take turns changing and editing it.

bulletin boards for LANs *(Michael Miley)*

Programs like MacVonk's Inforum and PacerForum from Pacer let you set up a BBS on a LAN. Inforum ($500 for

a server and five users) is a somewhat homely text-based system, without much to immediately appeal to icon-oriented Mac users. PacerForum ($550 for a server and five users) is more Mac-like.

PacerForum is hierarchical—you can prioritize various bulletin boards according to your interest in them (high, medium or low) or have PacerForum determine the priority automatically from your usage. You can attach pictures, sounds or files to any message, but some useful features are missing: you can't sort, group or filter messages, there's no real-time conferencing, and there's no way of linking to other BBSs. *[Ironically, most Mac BBSs are run on PCs because they're cheaper and because Mac BBS software hasn't gotten to the point where it can handle volume well.—ND]*

e-mail on LANs *(Rich Wolfson/Michael Miley/SH/JK/AN)*

You can set up an e-mail system on your LAN with CE Software's QuickMail or Microsoft Mail. With either program, you set up one Mac—ideally a file server, or some machine that isn't used much—to be the mail server (basically, it's like an e-mail post office). Then you put *client* or *user* software on each Mac on the network.

Microsoft Mail lists for $400 for the server software and $55–$80 per user (depending on quantity). QuickMail is *much* cheaper, since the user software costs about the same but the server software is included free. So for five users, say, Microsoft Mail lists for $800 and QuickMail for $400.

With either program, you can send files with your messages, design your own forms and even attach voice messages (recorded with the mikes that come with many Macs or Macromedia's MacRecorder). QuickMail also lets you have a real-time conference with several other users. Microsoft Mail can't do this, but the network version of an integrated program, WordPerfect Office, can (it lists for $75–$150 per user, depending on quantity).

Both programs are also available in PC versions, so Macs and PCs can exchange mail over a network. Yet they're both so Mac-like and easy to use that few users will need help getting started. QuickMail has more features, but Microsoft Mail is more reliable and easier to set up and use. Both programs provide gateways to AppleLink, CompuServe, MCI Mail and other online services, although QuickMail offers more.

Rich has used QuickMail since it was introduced, and has had no problems with it. Installation was a breeze and administration takes very little time (it's even fun). *[QuickMail is beautiful. It's the first piece of software that ever made me think that working in an office instead of at home might have its fun aspects.—SA]*

Because it would cost a fortune to buy a Microsoft Mail or QuickMail address for all of Rich's students, he uses Broadcast to introduce them to the concept of electronic mail. When you select Broadcast in the Chooser, it lists all the current users on the network who have it installed (and active, since you can shut it off when you don't want anyone to bother you). You select a user, type a message, and click the *Send* button; the message pops up in a dialog box on the receiver's screen, who can make an immediate, direct reply. (But you can't store messages.)

Both the students and Rich love Broadcast. It's shareware and costs $25 per zone or $100 for all the zones on your network. You can get it from Joachim Lindenberg, University of Karlsruhe, Post Fach 6980, 7500 Karlsruhe 1, Germany (AppleLink GER.XSE0010). *[It's also available on BBSs and online services.—JK]*

network management utilities *(SH/Rich Wolfson)*

There are several utilities available for managing and troubleshooting networks. Farallon's PhoneNet Manager's Pack is great and has lots of utilities, but it's very expensive ($1000). MacVonk's NetOctopus ($645 for a server

and ten users) lets you update software throughout a network. LocalPeek and EtherPeek ($500 and $800 respectively, from the AG Group) let you essentially wiretap a network to see where the information is flowing.

Apple's Inter•Poll ($130) lets you see who's on the network, what System, Finder and printer drivers they're using, the name and ID number of each device, what type of computer it is and its zone name. It's great for troubleshooting and maintenance—you can find out, for example, who's resetting the LaserWriter because s/he has an old printer driver, or who needs a System update. Inter•Poll's interface is functional, if not elegant. The program is simple to learn and use, and it works across network bridges. If you're a network administrator, it's a must-have.

One of the niftiest things about these utilities is that some will actually draw a network map for you. On a large network, this is almost worth the price just by itself.

Timbuktu and Timbuktu/Remote *(JK)*

When you use Farallon's Timbuktu, your screen reflects what's happening on another machine in the network. You can simply observe the other machine or actually control it with your own mouse and keyboard, as if they were attached to the remote computer. This is invaluable when someone on another floor, or in the next building, needs help. Network administrators with out-of-the-way file servers will also love Timbuktu. (It lists for $150 a copy, $2000 for a 30-pack.)

Timbuktu/Remote ($200) lets you do the same things as regular Timbuktu, but over a phone line. We did an experiment in which Arthur talked to us over the speaker phone in G&B's conference room in Berkeley while controlling the Mac there from his house in Tucson! It was very spooky—we refer to it as "the ghost in the conference room"—but not very practical; even with the 14,400-bps

modem we were using, the response time was too slow (we were trying to edit part of this book).

But for tasks in which the screen doesn't need to be updated so frequently, Timbuktu/Remote could be pretty slick (Ken Maki loves it). It certainly works well enough; the only problem is the data bottleneck caused by the phone lines.

Suitcase II on a network *(Rich Wolfson)*

Suitcase II (described in more detail in the utilities chapter) can be used on a network to share downloadable and screen fonts that are stored on a file server. It has to be installed on each machine in the network for this to work. (Be aware that once Suitcase has accessed files from a file server, you can't log off the server by dragging its icon into the Trash, because you'll be trying to cut the connection to the opened, active font files on the server.)

serial servers *(Rich Wolfson)*

Most modems, plotters and scanners aren't AppleTalk devices and can't normally be included on a network. But a *serial server* will network such devices. One that I've found reliable is Shiva's NetSerial ($400).

AppleTalk Remote Access *(SH/JK)*

AppleTalk Remote Access ($200 from Apple, or free with PowerBooks) lets you dial in to a remote network and access its resources (shared files, file servers and printers) as if your Mac were connected to the network (you can also do this with Liaison or with Shiva's NetModems, reviewed earlier).

PC to Mac and back

from the sublime to the ridiculous *(AN)*

If you use a personal computer at work, there's a frighteningly high probability that it isn't a Mac. Yes, the ugly reality is that most personal computers are IBM PCs or clones thereof—known generically as *PCs* or, if they use the MS DOS or PC DOS operating system, as *DOS* (pronounced *dahss) machines* (although *dross* machines might be a more appropriate name).

Although there's no way around the wrenching feeling in your gut you have to endure every morning when you travel back into the pre-Mac Stone Age of computing (or, if you're running Windows, into the pseudo-Mac Gilded Age, where everything is just slightly out of focus), you can at least transfer data back and forth between the office machine and your Mac at home. The tips below tell you how.

reading PC disks *(Rich Wolfson/Skye Lininger/SH/JK/AN)*

Apple's SuperDrive floppy disk drive can transfer files onto and off of DOS-formatted 3½" (hard-case) disks. (SuperDrives are built into every new Mac; if your old Mac doesn't have one, you can buy an internal one for $350 or an external one for $400.)

PC disks don't show up as icons on the desktop, so you have to access their contents from within the Apple File Exchange (AFE) software that comes on your Mac software disks. (Of course, just because you can *transfer* the files doesn't mean the Mac can *read* them—they generally have to either be text files or specially formatted by a PC program—but see the next entry for some exceptions.)

Three other utilities—Apple's Macintosh PC Exchange ($80), Dayna's DOS Mounter ($90) and Insignia's AccessPC

($100)—create disk, folder and file icons for PC disks. DOS Mounter even generates the correct icon for the application, based on the PC files' extensions. For example, it can add a PageMaker icon to all PC files with PM extensions. AccessPC allows you to mount PC-formatted SyQuest cartridges on your desktop.

Apple offers an external floppy disk drive for $330 that reads 5¼", 360K PC disks (the ones that are soft and actually floppy). But as with the SuperDrive, the disks don't mount on your desktop unless you use one of the programs described above.

The DaynaFile II 5.25" floppy disk drive ($600) attaches to any Mac's SCSI port. One version handles 360K PC disks and another 1.2MB disks. Both versions include DOS Mounter and file translation software.

🍎 *over cables and phone lines* *(Skye Lininger)*

You can transfer files back and forth between a Mac's modem and a PC's serial port with Traveling Software's LapLink Mac III ($150, including the necessary cable). Its normal speed is 115,200 bps, about half the rate of a LocalTalk network, but an optional accelerator can get you up to 750,000 bps. This product is handy for moving files to and from a PowerBook 140, 145 or 170, and it can also convert between numerous text and spreadsheet file formats.

Most Mac communications programs will let you transfer files from PCs over phone lines, and also upload a DOS file to an online service and download it with your Mac.

🍎 *TOPS* *(Eric Alderman/SA/SH/JK)*

Sitka's TOPS (the name stands for *transcendental operating system)* lets Macs and PCs share files over a network in a way that's similar to System 7's file sharing. Shared

PC files show up as icons on the Mac desktop, and PC users can use DOS commands to navigate around a shared Mac volume. Transferring files from the Mac to the PC is best done from the Mac end, though—if Mac files are copied to the PC using DOS commands, they'll lose their formatting.

If you're using a program that comes in Mac and PC versions, you don't even have to copy the file off the other computer's disk. For example, you can work on an Excel file from the remote PC disk while using Excel on the Mac. TOPS also includes a program called MacLinkPlus (from DataViz) that can translate documents between several common Mac and PC word processing, spreadsheet and graphics formats.

TOPS costs $100–$135 per machine, or $250–$300 for an individual. To use it, each PC also needs a LocalTalk interface card, like Farallon's $300 PhoneNet Card/LocalTalk (but the Macs don't).

what gets lost in the translation *(DC/Skye Lininger/JK)*

Some popular programs—like Word, WordPerfect, Excel and PageMaker—come in both Mac and PC versions. Documents created by either version are readable by both computers. Most major word processors and integrated ("Works") programs also include translators that let you import files from other programs and other computers. The XTND translators, developed by Claris but widely used by other manufacturers, allow programs like MacWrite and Nisus to open files created by the PC versions of Word and WordPerfect, or even WriteNow files from NeXT computers or AppleWorks files from the Apple II.

If you need to use a PC file from a program that has no Mac counterpart, find out if the file can be saved in or converted to a format the XTND translators can handle. If it can't, you'll have to save it as a text *(ASCII)* file and all your formatting will be lost.

Spreadsheet users are in good shape, thanks to some standards in the industry and to the flexibility of Excel, the most popular spreadsheet on the Mac, which can read files from 1-2-3 on the PC (that computer's most popular spreadsheet) directly. You can also save Excel files in 1-2-3 format. The main limitation is that macros written in one product won't work with the other.

Database files also transfer fairly easily if the PC program uses the Mac standard format of Tab between fields and Return between records. Several Mac databases (FileMaker and FoxBase, for example) can read files from the popular PC database program dBase (but they feel debased afterwards).

Fonts often have different names on the PC and Mac, in which case you have to rename them or get printouts in Courier (which is what PostScript printers substitute for fonts they can't find). PageMaker comes with a translation table that can convert some, but not all, fonts.

running PC software *(Rich Wolfson/SH)*

Universal SoftPC from Insignia Solutions is a software-based PC emulator. It can run most popular DOS programs and even lets you copy text from the PC window and paste it into a Mac application. Soft PC ($325 list) requires a Mac Plus or later with four megs of RAM (two if you're using System 6). There's also a more powerful and faster SoftAT ($500 list) which requires at least a Mac II with five megs of RAM (four with System 6). Both emulators run much slower than a real PC; the lag is particularly noticeable when you're installing software.

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Macs and Apple IIs

importing AppleWorks files *(JK)*

As noted above, many Mac word processors, integrated programs and other applications now include XTND translators that allow you to import AppleWorks files from Apple IIs. If your application doesn't, call the manufacturer—XTND is sometimes available as a free upgrade.

running Apple II software *(Rich Wolfson/SH)*

Apple II emulation doesn't get as much attention as PC emulation, but it's often critical in schools that have big investments in Apple II software. Apple's own Apple IIe emulation card ($200 list) works with a Mac LC (if you're running its monitor off the built-in video port) but it doesn't work with any other Macs. The card includes a port for an external floppy 5¼" disk drive; to use it with an LC II, you need version 2.1 or higher. (If you've got an earlier version, a software upgrade is available for $30.)

Though Apple's card is much more popular, a program called II In A Mac will also run Apple II software on a Mac. It's proven very useful at Rich's school on many occasions. Be aware, however, that it won't run any copy-protected software—which includes most games and a lot of educational programs.

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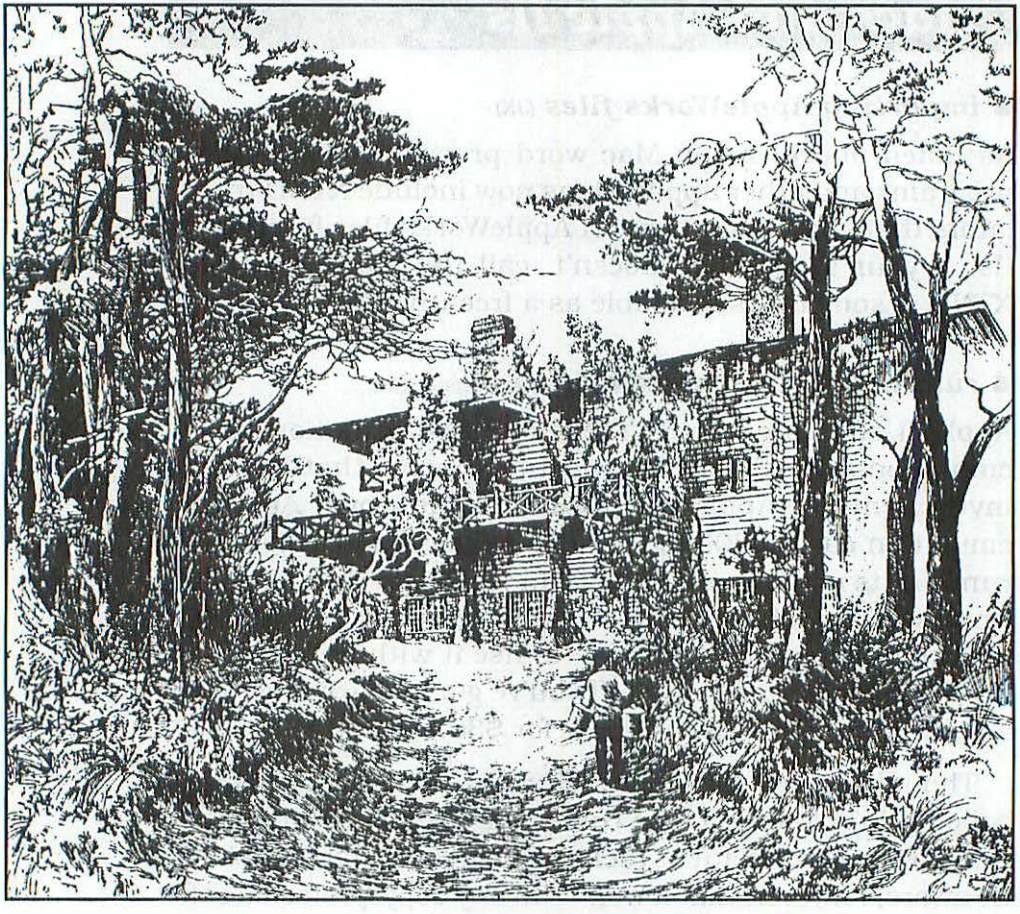

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Integrated programs

integrated program overview (CS/AN)

mostly for beginners

Integrated programs combine a word processor with several other applications, most commonly a spreadsheet, database and communications program (each of which is called a *module*), plus some drawing tools (or sometimes a whole drawing module). The features of these modules tend to be somewhat limited compared to those offered by stand-alone applications of the same type, but integrated programs save you money and give you the basic stuff you need.

Here's a summary of what various integrated programs offer:

	wp	ss	db	cm	dr	pt	pl	other
MS Works 2	•	•	•	•	•		•	
ClarisWorks	•	•	•	•	•		•	
GreatWorks 2	•	•	•	•	•	•		ol
HandiWorks	•	•			•		•	pb
Zedcor Desk	•	•	•	•	•	•		tm

cm = communications program; db = database; dr = drawing tools (or program); MS = Microsoft; ol = outliner; pb = phone book; pl = page layout tools; pt = paint program; ss = spreadsheet; tm = time manager; wp = word processor

Microsoft Works has more than 90% of the integrated-programs market on the Mac. It's been around the longest and has the most extensive support (which includes books, training services and libraries of macros) but several rivals have appeared on the scene. Reviews of the programs are below, followed by tips on Microsoft Works.

Microsoft Works 2 (SA/AN/CS)

very bad feature

Version 2 of MS Works ($250 list) has been around forever, but by the time you read this, version 3 will probably be

out (it's about time). Unfortunately, Works 2 has a terrible design flaw that (in Arthur's opinion, at least) is reason enough, all by itself, not to use the program. In virtually every other Mac program, ⌘Z toggles between *Undo* and *Redo*—but not in Works. This may not sound like much of a problem, but it means that if you accidentally hit ⌘Z, all the work you've done since the last time you clicked the mouse is irretrievably lost!

Incredibly, this ridiculous bug was not corrected in Works 2, thereby slipping over the line from gross negligence to willful misconduct—and, in the process, winning the much-coveted Naiman Prize for Brain-Dead Software Design. Let's hope they've fixed it in Works 3.

As for the various modules, Works' word processor is perfectly adequate. It has integrated drawing tools, basic page-layout functions (through the Text tool of the drawing layer), a built-in macro editor, mail merge (from the database module) and all sorts of tables (from the spreadsheet module). But it's still missing a lot of basics, like footnoting and separate headers/footers for even and odd pages (and it uses a really lame way of constructing a basic header or footer).

The database module is usable, but it's nothing great. You're limited to just two views of your data—a spreadsheet-like list and the form you design. Fields can't be any longer than the width of the window, which means no multiline entries for, say, comments. The draw function you get in the word processor and spreadsheet isn't available in the database module. And the Report function has one of the ugliest, most counterintuitive interfaces on the Mac.

Still, if you only need basic data records and mailing labels, the database is functional, and you can get around many of its design limitations by merging information from it into the word processor and using the draw function.

Works' spreadsheet module is all most people need for their personal work; it's even enough for most business tasks. It has over a million cells (you'll use a lot since you can't link separate spreadsheets) and all the basic mathematical, statistical and financial functions. It lets you format cells various ways, has cell notes, and even provides basic charting.

The spreadsheet's most frustrating lack is its inability to handle text. (You can enter it, but you can't manipulate it at all.) In fact, the spreadsheet considers a cell with text in it a blank cell (so you can't even write a formula that says *if the content of cell C34 is "yes" then...*).

ClarisWorks *(CS)*

ClarisWorks ($300 list) gets high marks for integration. All its modules can be called on from a single page, which means you don't have to quit one module and start another. It also has many advanced features, like a huge thesaurus (more than 600,000 words), a fast spelling checker, built-in macro capabilities, automated log-on files for popular on-line services and more than 20 file translators (the more translators you have, the easier it is to share files with people who use other programs).

ClarisWorks lets you anchor blocks of text and graphics to particular locations on a page, move them around and link them. This means that, with a little practice, you can substitute ClarisWorks for a page layout program (at least for documents of about five pages or less; for longer documents, it's not worth the trouble). If you had to pick one piece of software and stay with it for years, ClarisWorks would be a less confining choice than Microsoft Works.

GreatWorks 2 *(CS)*

Symantec's GreatWorks 2 ($300 list) is the most System 7-savvy integrated package. Its implementation of Publish and Subscribe (see the *Basic Mac Software* chapter for

more about that) lets you make automatic copy-and-paste links between different GreatWorks documents. GreatWorks also has the longest list of file translators of any integrated product.

Two additional features distinguish this package from its competition. First, its paint module is a pretty fair 8-bit color paint program in its own right. Second, the word-processing module offers outlining functions—particularly useful for preparing long documents or presentations.

GreatWorks' modules aren't as smoothly integrated as those in ClarisWorks, but most of them are stronger as applications than their Claris equivalents. I ran GreatWorks on a basic Mac LC (with 4MB of RAM, running System 7) with no hangs or crashes even during fancy linking tricks, and I had a great time with the paint module.

HandiWorks *(CS)*

RagTime was a pioneering European attempt to merge spreadsheet, word processor and page layout functions (it's still available for $600 from MacVonk•Canada). MacVonk•USA added a phone book (in place of the expected database module) and a good list of file translators and called the result HandiWorks ($175 list).

The problem is, history has passed by most of the original product's features. Its spreadsheet doesn't do charts, for example—no one would dream of allowing this omission in a new product. Although the layout features are well-designed and the word processor and spreadsheet can be used simultaneously on the same page, you can get the same functionality in ClarisWorks, plus several other modules.

Zedcor Desk *(CS)*

The modules in Zedcor Desk ($400 list) are word processing, database, spreadsheet, telecommunications, drawing, painting and a unique time manager. The gimmick

is that any of them can be run as a DA (this is useful under System 6, where DA's are the only things you can have under the menu). The package isn't really "integrated" the way the others are, because links can only be made through cutting and pasting, but each module—particularly the ones for drawing and painting—would be a respectable stand-alone application.

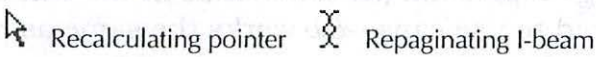
What's more, you can use Desk to make a mock-integrated system out of other software. If you spend 95% of your time in Word, for example, you can link Desk's spreadsheet and database DA's to it to construct a custom "integrated" package.

General MS Works tips

special pointers *(SA/Hal Lewis/AN)*

MS Works has two unusual pointer shapes—a hollow arrow, which usually shows up in the spreadsheet module, and an I-beam with a circle in its center, which usually shows up when you're working with large word processing documents.

These special pointers mean that Works is thinking—recalculating in the spreadsheet, for example, or repaginating in the word processor. Unlike the wristwatch, these pointers don't prevent you from continuing to work, but merely let you know that what's currently on the screen may be subject to change.



window tools *(SA/SM)*

Works gives you three ways to make a window fill the screen or zoom back down to the size, shape and position you set up:

- click on the zoom box
- double-click on the title bar
- double-click in the size box

⌘, brings the window listed at the bottom of the Windows menu to the top of the pile, and also moves its title to the top of the list. Repeated uses of ⌘, will cycle you through all the available windows.

double-clicking for New *(SA)*

Double-clicking on a module icon in Works' Open dialog box has the same effect as selecting it and then clicking the *New* button.

clicking on the scroll box *(SA/AN)*

A click in the gray area of the scroll bar shifts the contents of the window up or down by one screenful (and moves the scroll box accordingly). In a really big document, the scroll box can get so close to the top or bottom of the scroll bar that there's virtually there's no gray area left to click in.

If that happens, just click in the scroll box itself. If it's closer to the top of the scroll bar, it will move up; if it's closer to the bottom, it will move down (and the contents of the window will move accordingly). Usually only spreadsheets get so big that you need to use this trick, but it works in all modules.

header and footer formatting *(SA/AN)*

Formatting headers and footers is done by typing the following ampersand (&) commands in the text box (you don't need to use caps—*&b* works the same as *&B):*

&B	make bold	*&C*	center
&D	insert date	*&I*	make italic
&L	align left	*&P*	insert page number
&R	align right	*&T*	insert time
&F	insert name of file (document)		

Be aware that *&D* or *&T* insert the date or time you *print* a document, not when you created or saved it. And be aware that *&B* and *&I* only affect the text that *follows* them; to change the style of all the text in both the header and footer, use the Style menu (you can also change the font and size there).

If you want an ampersand itself to appear in a header or footer, precede it with another ampersand: &&. Only one will be printed.

❦ *import/export* (SA/AN)

mostly for beginners

To make the *Import* checkbox in Works' Open dialog box available, you have to first click on one of the module icons; when the *All Works* icon is selected, the *Import* checkbox is dimmed. Once it's active (and you've clicked on it), you'll see a list not just of Works documents but of all others that can be imported into the selected module (e.g. Word files for the word processor, Excel documents for the spreadsheet, text files for all modules).

The *Export* checkbox in the Save As dialog box saves only the text of your document. You can then import it into another module in Works or into any Mac application that accepts text files.

As you move information from one module to another, keep in mind that *tabs = columns = fields*. So if you move columns from the spreadsheet into the database, each column will be a field, and if you move them into the word processor, they'll be separated by tabs. In fact, it's a good idea to create all your word processor tables in the spreadsheet module, even if they don't contain any numbers, because columns are easier to manipulate there.

very hot tip

To get a list of incremental numbers (1, 2, 3, say, or 100, 200, 300) in your database without having to type them all in, use a formula in the spreadsheet that says add 1 (or whatever) to the cell above. Copy it down a column

very hot tip

as far as you need to, then copy the column and paste it into the database in the appropriate field.

The Report function in the database can't handle anything beyond totals and subtotals across records. If you need more sophisticated reports that show averages, say, or use statistical functions, paste the database information into the spreadsheet and create the formulas there. You can paste it into the word processor for formatting before you print it.

The spreadsheet is also great for alphabetizing a list. Just paste it into a new spreadsheet, sort it there and then paste it back into the word processor.

You can also share information between Works' modules by simply cutting and pasting between them, but often the export/import method is better. For example, importing spreadsheet data into the database automatically creates the correct number of fields (equivalent to the spreadsheet columns) and records (equivalent to the spreadsheet rows). If you simply paste the data in and there aren't enough fields to hold it, rows of information will be lost.

selected form letters *(SA)*

You don't have to send form letters to everyone in a database when you're using the word processor's merge-print function (*Prepare to Merge* on the Edit menu). If you do a selection in the database (with the *Record Selection* command) before you merge-print, form letters will be generated for only the selected records.

the macro recorder *(SA/SM)*

Works' macro recorder only lets you use Option as a modifier key, which severely restricts the number of keyboard commands you can create. So it's better to use QuicKeys or Tempo instead. But if you do use it, ignore the Playback window when choosing a macro, and just press Option along with whatever key you assigned to the macro.

constraining movement with Shift (SA)

Unlike every other Mac program I can think of, MS Works requires that you press Shift *after* you press the mouse button if you want to move objects in the draw layer straight up and down or straight sideways. This only applies to dragging. When you're using the rectangle or oval tools, you can press Shift before the mouse button and still get squares and circles (but you can also press Shift after you've started drawing with these tools).

text objects and columns (SA/AN)

To link a draw-layer text object to another (and thus make it a *column),* select it and then double-click on a column or other text object. (You can also select the column first and then double-click on the text object, if that's the link order you want.) To unlink a column, click in the body of the column with the text tool to display the header (clicking with the selection arrow won't do it). Then edit the header so that it reads *NONE* after *Link.*

Works names its draw-layer columns numerically as you create them. You can rename them, as long as you keep *Col* at the beginning. This lets you name columns to keep track of links, etc. (e.g. *Col Front Page Article).*

centering pasted objects (SA/AN)

Choosing *Paste* while a draw-layer object is selected will center the pasted object in or around the selected object (depending on whether it's smaller or bigger). You can use this feature to put a frame around something, or to align graphic elements. To do that, hold down Shift and drag either the pasted object or the one you originally selected away from the other. Since they started off centered on each other, they'll end up aligned vertically or horizontally (depending on which way you drag).

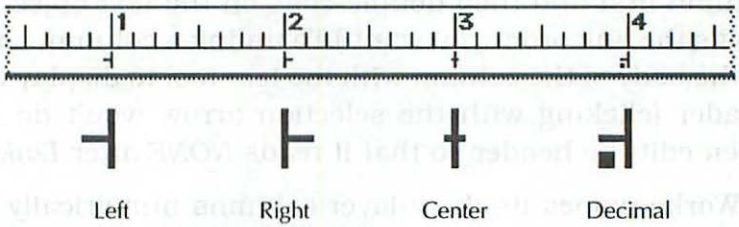
✎ *Inside Microsoft Works* (AN)

The Cobb Group, which publishes many excellent journals of tips on various Mac and PC programs has one for MS Works. Called *Inside Microsoft Works*, it costs $50 a year, comes out monthly and is full of tips like the ones in this book. If you use Works a lot, it's worth checking out.

MS Works word processor tips

✎ *the four tabs* (SA/Hal Lewis)

Works has four different types of tabs: left, right, decimal and centered. Here's what they look like on the Ruler:



To get a left-aligned tab, click once; to get a right-aligned tab, double-click; to get a decimal tab, triple-click; and to get a center tab, quadruple-click (there's a word you don't see too often).

Clicking on an existing tab changes it to the next type, and it goes around in a circle (from the center tab back to the left tab again). So if you're moving a tab on the Ruler, make sure you hold the mouse button down as you drag—if you release it too soon, the tab will change to a different type.

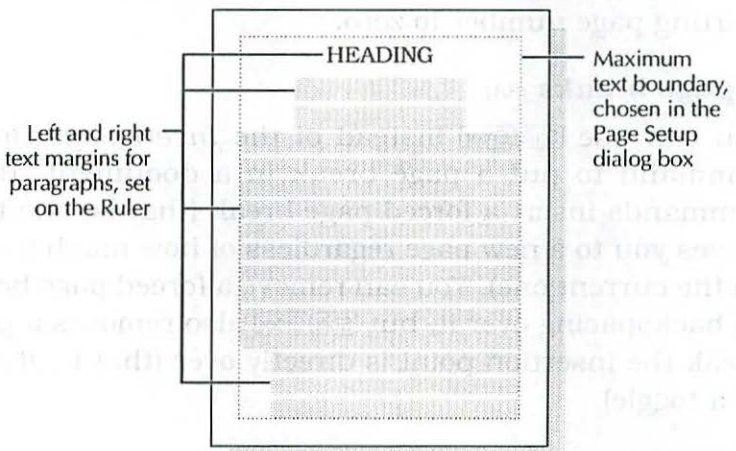
✎ *automatic entry of search text* (SA)

If any text is selected when you use the *Find* or *Replace* command (both on the Search menu), it's automatically entered into the *Find What:* text box.

margins vs. indents *(SA/SM/Hal Lewis)*

As the manual tries to make clear, Works' margins are set in the Page Setup dialog box while indentations—left, right and first line—are set on the Ruler. It may help you avoid confusion if you think of the Ruler as controlling left and right text margins for specific blocks of text, while Page Setup controls the maximum allowable margins.

The zero mark on the Ruler is set wherever the left Page Setup margin is. So with a one-inch Left Margin setting in Page Setup and a zero setting for the left indent on the Ruler, the text begins one inch in from the left edge of the paper. If you set the indent on the Ruler at one inch as well, the text will begin two inches in from the edge of the paper. Paragraphs on a page can have various right and left indents, but the Page Setup margins remain constant.



If you put the right indent marker on the Ruler beyond the right Page Setup margin, it turns into a hollow triangle. Since Works won't print anything beyond the margin you've set in Page Setup, you'll lose some text (or graphics) at the ends of your lines.

[I hate this old-fashioned, pre-Mac way of treating margins, which is a leftover from the primordial ooze of

CP/M. After all, the only thing that counts is how far the text is from the edge of the paper; to indent a paragraph, you should just have to increase that one, single measure.

There are no such things as text margins and paper margins—there are just margins. This is a good example of the opposite of transparency—instead of being invisible, the mechanics of the software intrude and distract you from your work.—AN]

page zero *(SA)*

When you use the *Title Page* command, the header and/or footer isn't printed on the first page of the document, but the next page is marked Page 2 (assuming, of course, that you have a command that reads *Page &p* in the header or footer). To make the second page read Page 1, choose the *Set Page* command (on the Format menu) and set the starting page number to zero.

page breaks *(SA)*

You can use Shift Enter instead of the *Insert Page Break* command to put a page break in a document. Both commands insert a forced page break (that is, one that moves you to a new page regardless of how much text is on the current one). You can remove a forced page break by backspacing over it, but Shift Enter also removes a page break the insertion point is directly over (that is, it acts as a toggle).

drawing in the word processor *(SA)*

If you turn *Draw* on but the crosshairs pointer doesn't appear when you place it where you want to start drawing, you're probably trying to draw past the end of the document. Just add some empty lines with the Return key and the draw function should work.

If you have both text and graphics stored in the Clipboard, pasting will insert both into the document—unless

you have *Draw* on, in which case only the graphic object will be inserted.

multiple labels (SA)

To print address labels that all have the same name and address (because you're sending a shipment of many boxes, say), set up the merge document the way you would for regular multicolumn labels, but don't check the *Multiple Labels* option. Go to the database window and select the record that contains the information you want. Then move back to the word processor and use the *Print Merge* command.

MS Works database tips

The first three entries in this section also apply to Works' spreadsheet module. The rest of the entries just apply to the database.

entering data (SA/AN)

mostly for beginners

When you enter information into a database field or a spreadsheet cell, it first appears in the text box at the top of the screen (which is called the *Entry bar).* It gets entered only when you leave that field or cell and move to another one (by hitting Return, Tab or whatever), or when you hit Enter or click on the checkmark icon just to the left of the Entry bar (both these commands leave you in the cell but place whatever's in the Entry bar into the cell or field).

If you want to enter text that begins with a +, – or =, you can't simply type it in a cell, since Works will think it's a formula. So type a quotation mark—a regular, straight one ("), not a curly one—first. The quote mark won't appear in the cell, just in the text field at the top of the screen.

If you format a cell for dates, any date you enter in it will always have the year appended to it. If you want

dates without years, you have to leave the cell formatted as General. But if you enter a yearless date in a General cell (Nov 15, say, or 6/20 or 12-5), it will be converted to a "serial" number that Works uses to calculate the number of days between dates. For example, if you type *Nov 14*, some number like *31364* will be displayed in the Entry bar when you select that cell. The way around this is, again, the straight quote mark ("). It won't be displayed in the cell, but will force the cell contents to be treated as text.

Both the spreadsheet and the database understand percent signs. So there's no difference between typing 50% and .5—Works treats them both the same.

❦ *moving around* (SA)

There are lots of ways to move around in the spreadsheet or in the List view of the database:

keys	*move you*
Tab or →	right
Shift Tab or ←	left
Return or ↓	down
Shift Return or ↑	up

If you select a portion of the grid, your movements will be restricted to it. For example, if you're at the bottom of the selected area and hit Return (or ↓), you'll be wrapped around to the top of the selected area and find yourself in the top cell of the leftmost selected column.

❦ *too-narrow columns* (SA/AN)

mostly for beginners

Sometimes a database field or spreadsheet column is too narrow to display the contents of some of the fields or cells.

If it's text that won't fit, the database simply displays as much as it can in the space provided. The spreadsheet does the same, but it will overflow the text into the next cell (or cells) if it is (or they are) empty. It's different if what won't fit is a number. Both the database and

spreadsheet will give you a string of pound signs (#####), and you'll have to widen the column or field to see what the number is.

entry shortcuts (SA)

- You can enter the date into any database field by pressing ⌘D and the time by pressing ⌘T.
- To enter the same information into a database field as is in the same field in the previous record, just press ⌘'. Think of it as *ditto* (") to make it easier to remember. If you're using Quote Init, or if you've reassigned the quote keys using QuicKeys or some similar program, you'll have to turn the curly quotes off for this command to work.

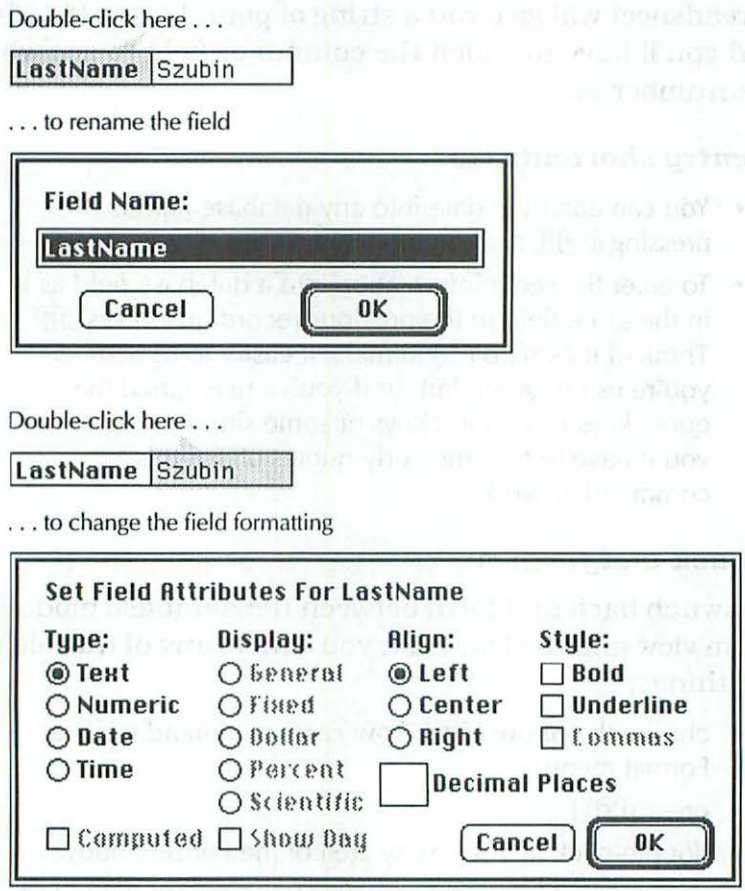
back and forth (SA)

To switch back and forth between the database module's Form view and the List view, you can do any of the following things:

- choose the *Show List / Show Form* command (on the Format menu)
- press ⌘L
- double-click in any empty area of the Form window
- double-click in the space in front of a record in the List view to go directly to that record in the Form view
- double-click in an empty cell in the List view to go to the currently selected record

dealing with fields (SA / Hal Lewis)

In the Form view, fields have two distinct parts: the field name and the field data. Double-clicking in the field name area lets you rename the field; it's the same as using the *Change Field Name* command on the Edit menu. Double-clicking in the field data area opens the Field Attributes dialog box; it's the same as using the *Set Field Attributes* command on the Format menu. In other words:



If you use *Cut*, *Clear* or Delete when a field is selected, the field data, not the field itself, is affected. The only way to get rid of a field is by using the *Delete Field* command (on the Edit menu).

✎ *pasting from the List view* *(SA)*

There's a slightly unexpected result when you copy from the database's List view and paste into the word processor or spreadsheet, but it's done on purpose and is very useful. The field names will appear at the top of the pasted columns, even though you can't select them when copying.

using spreadsheet functions (SA)

Many of the spreadsheet functions can be used in the database's computed fields. For example, you can use the *Average* function to construct a formula that averages the contents of other fields in the record. The only spreadsheet functions that can't be used are the ones that deal with cell *ranges*.

sorting (SA/SM)

⇧⌘S is for *Save*, so it can't be for *Sort*. Works uses ⇧⌘A instead (to remember the command, think of *arranging*). Works' spreadsheet lets you sort by up to three columns at a time, but its database allows only a single-level sort. To get a multilevel sort, see the entry with that title in the general database tips in Chapter 10.

searching and selecting (SA/AN)

Works' search commands are on the Organize menu. The *Find Field* command doesn't start with the current field and record but with the *next*. Then it goes through the file to the end, starts back at the beginning and continues down to the current field and record, which it searches last.

The *Find Field* command displays a record at a time; the *Match Records* command searches through the entire database and then displays all the records that have fields that match the search criteria. Neither command pays attention to upper- and lowercase letters (search for *Mac* and you'll find *mac* and *MAC* as well), nor do they care about whole words (search for *Mac* and you'll find *machine* and *stomach* as well).

Both *Find Field* and *Match Records* find records regardless of what field whatever you're searching for is in. So if you search for *John*, you'll get first names of *John*, last names of *Johnson*, addresses of *St. John Street*, etc. But the *Records Selection...* command lets you specify which field Works should look in, and also lets you decide to

search for a whole word, part of a word, the beginning of a word, etc.

When you're viewing and/or working with a subfile created by the *Record Selection* command, it's hard to tell the difference between that subfile and the main "parent" file. To find out which you're in, look to see if the *Record Selection* command is checked. If it is, you're working with a subfile; if *Show All Records* is checked, you're not.

Likewise, if you're working with a subfile created by the *Record Selection* command and you start a new report, it initially includes only that subfile. To include all the records, use the *Show All Records* command while the Report window is active. The selection rules you create when you do that affect only the report, not the main database window, which will continue to display only the selected records.

totaling on the first character (SA)

The *Take a sub-Total on 1st Char* command on the TotalsPage menu creates subtotals in a report when the first character of a field changes instead of when the entire field contents change. This means you could do a subtotal for a column that contains stock part numbers and have the subtotals for all the parts with numbers in the 100s, then those with numbers in the 200s, etc. (Normally, without the *1st char* option, you'd get a separate subtotal every time the field contents changed—so you'd have a subtotals for 101, 102, 103 and so on.)

AND OR hierarchy (SA)

When you use multiple selection rules in the Record Selection dialog box and you're mixing ANDs and ORs as connectors between the rules, you have to be careful how you arrange the rules. For example, if you're looking for customers who owe you more than $200 and also either

live out-of-state or have owed the money for more than 60 days, you can't use the following rules: Amount is greater than 200 AND Invoice Date is less than 10/01/93 OR State is not equal to NY, because Works will interpret them to mean: [Amount is greater than $200 AND Date is less than 10/01/93] OR [State that is not NY]. In other words, you'll wind up with all the records that don't have NY addresses regardless of what the customer might owe.

The AND connector for a rule always takes priority over the OR connector in a list of rules. Unfortunately, you can't just use parentheses to circumvent this, as you can in a spreadsheet or database formula. Instead, you'll have to redo the rules as follows: Amount is greater than 200 AND Date is less than 10/01/93 OR Amount is greater than 200 AND State is not equal to NY. These rules will be interpreted as: [Amount is greater than 200 AND Date is less than 10/01/93] OR [Amount is greater than 200 AND State is not equal to NY].

MS Works spreadsheet tips

inserting rows and columns *(SA/AN)*

mostly for beginners

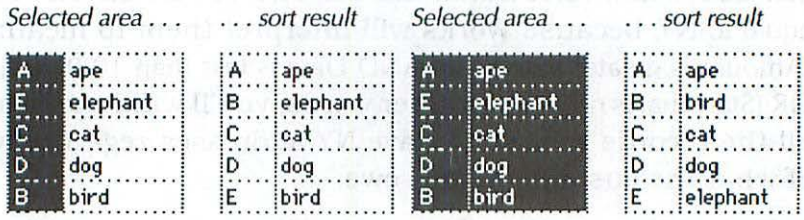
The *Insert* command in the Edit menu inserts a new row in the spreadsheet if you've clicked on a row's number; if you've clicked on a column's letter, it inserts a column. New rows are inserted *above* the currently selected one; new columns are inserted to the *left* of the selected one. If you have a cell or range of cells selected in the spreadsheet when you choose *Insert*, a row is inserted above the uppermost cell of the selection.

sorting *(SA/Hal Lewis/AN)*

mostly for beginners

In the database module, you can select a column to sort on (in the List view) and all the information in the rows (records) stays together. But in the spreadsheet module,

columns sort separately, so you have to select which rows and columns you want sorted.



✎ *cell-click shortcuts* (SA)

You can move the contents of a selected cell by holding down ⌘Option and clicking in the cell you want the information moved to—the data jumps right to the new spot. This works with a selected group of cells too.

Double-clicking on a cell opens the Set Cell Attributes dialog box. But if you want to set attributes for a group of selected cells all at once, you'll have to use the menu command, because double-clicking on one of the cells deselects the rest of the group.

Instead of using the *Open Cell Note* command in the Edit menu, hold down ⌘ while double-clicking on the cell.

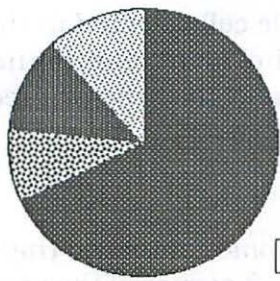
✎ *Go To Cell vs. Find Cell* (SA)

Both the *Go To Cell* and *Find Cell* commands (on the Select menu) search for a cell with contents that match what you type in their respective dialog boxes. But only *Go To Cell* lets you type the name of the cell (A1, say, or V12) you want to go to.

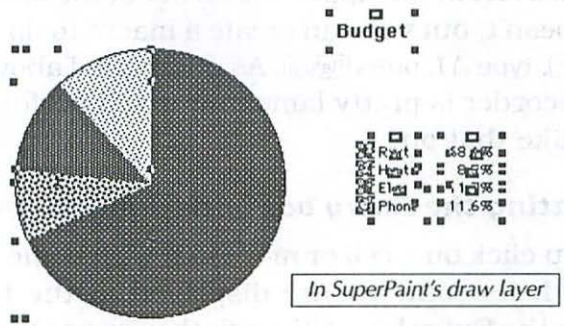
The second, more subtle difference between the two commands, is that *Find Cell* selects the found cell; *Go To Cell*, despite what seems like a direct order, merely makes sure that the named cell is visible in the window. It's not selected and if the cell is already displayed on the screen, you won't see anything happen at all.

exporting charts *(SA/Hal Lewis/AN)*

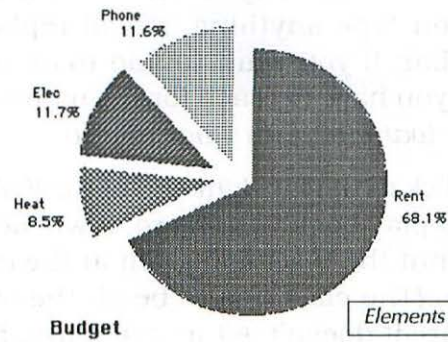
You can copy the charts that Works' spreadsheet module creates simply by choosing Copy from the Edit menu (or hitting ⌘C) when the Chart window is active. You don't have to select the chart first. These charts are object-oriented, which means if you paste them into a draw program, you can edit and move each element separately—change the fill patterns, pull out a slice of the pie, move titles around, etc.



In Works' chart window



In SuperPaint's draw layer



Elements rearranged, patterns changed

✎ *the border commands* (SA)

mostly for beginners

If you have only a single cell selected in the spreadsheet, using the Outline command in the Borders submenu is the same as choosing Left, Right, Top and Bottom one after the other. But if you have a group of cells selected, these commands work a little differently. Outline puts a border around the outside edges of the group as a whole; Left, Right, Top and Bottom work on each cell in the selection.

✎ *the print area* (SA)

mostly for beginners

If you have more than a single cell selected in the spreadsheet when you choose the Print command, Works assumes you want only the selected area printed, not the entire spreadsheet.

✎ *a Home macro* (SA)

shortcut

Many spreadsheets have a *Home* command that puts you back at cell A1, in the upper left corner of the spreadsheet. Works doesn't, but you can create a macro to do it for you: Press ⇧⌘F, type *A1*, press Return. As mentioned above, Works' macro recorder is pretty lame, but it will perform simple macros like that one.

✎ *activating the Entry bar with a macro* (SA)

shortcut

When you click on a cell or move to it with some keyboard command, its contents are displayed at the top of the screen in the Entry bar. Although they're not highlighted, they are selected—if you type anything, it will replace what's showing in the bar. If you want to add to or edit the contents of the bar, you have to reach for the mouse—*unless* you make an *activate the Entry bar* macro.

very hot tip

To do that, record a click in the far right end of the Entry bar. That's it! When you play back the macro, it will activate the Entry bar and put the insertion point at the end of the data that's there. (The click has to be all the way to the right, to make sure it doesn't get inserted into the middle of a formula instead of at its end.)

the Paste Function command (SA)

The main advantage to using the *Paste Function* command (on the Edit menu) instead of just typing in the name yourself is to make sure it's entered correctly. As an added convenience, the equal sign that signifies a formula is also typed for you, and the insertion point is placed inside the parentheses that follow the function name.

blank cells (SA)

As far as Works is concerned, any cell that doesn't contain a number is blank—even if it contains text. So, if you use something like the *IsBlank* function, it will return a *1*—for *true* ("yes, it's blank")—even if there's text in the cell.

more spreadsheet tips (SM)

For more spreadsheet tips, see the first three entries in the database tips section above.

MS Works communications tips

dialing (SA/AN)

You can store numbers in the Dial dialog box (on the Communications menu) or you can just type the number right in the window. Type *atdt* in front of the number; when you hit Return, it will dial through the modem (assuming it's Hayes-compatible).

sending text (SA/AN)

The *Send Text* command (on the Communications menu) can't send ordinary Mac text files (that is, without formatting and graphics), but only text files generated by Works' word processing module. To send a text file generated by another program, or another Works module, you have to use the *Send File* command (on the same menu) and click on the *Xmodem Text* button.

Another way to send text is to paste it from the Clipboard into the communications window. It gets treated just as if you typed it in—that is, it appears on the screen one character at a time (although more quickly than you could actually type it).

changing the baud rate *(SA)*

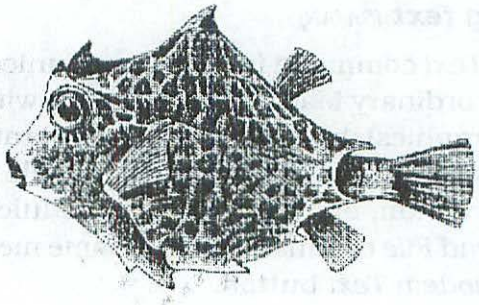
You can change the baud rate even if you're right in the middle of a communications session, by choosing the *Settings...* command (on the Communications menu).

control characters *(SA)*

Information services often require that you use control characters (key combinations involving the control key) as commands. With most Mac software, you can substitute the ⌘ key for the control key, but in Works, using the ⌘ key triggers a menu command. The Option key works, however. Even if you're using a Mac-specific service that tells you to use ⌘S, using OptionS will get you the results you want.

no curly quotes *(SA)*

If you use a utility like SmartKeys or Quote Init that changes your plain quotes to the curly ones, you won't be able to type any quotes or apostrophes at all in the Works communications window—you'll just get a beep if you try. So turn off your curly quotes program while you're telecommunicating with Works.



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Chapter 19

Programming and resource editing

Programming on the Mac.....973

ResEdit 981

Programming on the Mac

basic programming terms (AN)

mostly for beginners

The first thing to understand is the difference between a *programmer* and a *user.* Programmers use *programming languages* to write programs; when bugs turn up in the programs, they fix them, and when new features are needed, they add them. Users simply use the programs; the programming language is invisible to them (or should be).

It's like the difference between an automobile mechanic and a driver. Just as you don't need to know how a carburetor works to be an expert driver, you don't need to know anything about programming to be an expert Macintosh *user.*

The actual statements or instructions in a program are called *code.* Code is normally broken into *lines.* A relatively small piece of code, which does a specific task, is called a *routine.* Put a bunch of routines together and you have a *program.*

the Toolbox (DC/ND)

very good feature

One thing that puts the Mac's programming environment head and shoulders above that of other computers is a built-in feature called the Toolbox. It's partly in the ROMs and partly in System software, and it works like this:

Let's say you want to draw a circle on the screen. With old-fashioned computers, you have to write a great deal of code specifying every aspect of making a circle. On the Mac, you simply have your program call the Toolbox and use the code already written there to draw the circle. Many useful things are included in the Toolbox, including all the information the Mac needs to create windows, and menus.

which language to learn (PH/ND)

Many people who use a Macintosh want to learn to program. This desire is often inspired by an anguished "I can write

something better than *this!*" when a program doesn't do what they want. Unfortunately, writing programs for the Mac isn't nearly as easy as using one (in programming, as in so many other areas, easy is hard). You need to know fundamental programming concepts and at least one programming language. It can take years to become an expert.

If you want to take the time, you have three avenues to choose from: Apple's HyperCard (or one of its competitors, like SuperCard), C (the most popular language for professional programmers) or a graphical programming language like Prograph. All of these programs are discussed below.

mostly for beginners

HyperCard—designed for amateurs—is much easier to learn than C because it has a simpler structure and fewer hard-and-fast rules (it's like the difference between learning Spanish and Latin). A novice programmer can get more done more quickly with HyperCard—and without even having to learn about the Mac Toolbox. On the other hand, you can't go nearly as far with HyperCard as you can with C, which is why most sophisticated HyperCard applications include add-on programming modules created in C or Pascal.

mostly for power users

A graphic language like Prograph takes more time than HyperCard to learn, but you can get results a lot faster in it than you can in C.

compilers vs. interpreters *(AN)*

mostly for beginners

No matter which language you choose, keep in mind that there are two ways to implement a programming language—with a *compiler* or with an *interpreter*. Interpreters execute each line of a program individually each time the program is run, while compilers translate the whole program at once, before it's run. From that point on, you can run the compiled program whenever you want, without having to use the compiler to translate it again.

Compiling is more time-consuming when you're editing a program for mistakes, because you have to recompile the whole program each time you want to check out the effect of a change you've made (and large programs can take an hour or more to compile). But compilers are less time-consuming when you want to use the finished program over and over again. Interpreters are better for learning, because there's no compilation time, but they run more slowly each time through.

HyperCard *(Ed Allen/ND/SA/AN)*

BASIC (the name stands for *beginner's all-purpose symbolic instruction set)* has never taken off as a programming language for amateurs on the Mac the way it did on the Apple II and the IBM PC. Instead, we have HyperCard, which has been distributed free with every Mac sold since 1987.

Now that HyperCard is marketed by Claris, Apple will probably bundle a crippled version of HyperCard called Stack Runner with forthcoming Macs, but that hasn't been decided as of this writing. First released in summer 1992, Stack Runner is mainly a playback mechanism for ready-made HyperCard applications; it lets you *browse* (play back a HyperCard stack), *type* (enter data) and *paint* (create MacPaint-style graphics). In its full-fledged form, HyperCard is a programming environment with two additional levels: *authoring* (which lets you edit buttons and fields) and *scripting* (which lets you program in a relatively easy-to-understand language called HyperTalk).

HyperCard's basic structure is *cards*—screens of information—which are organized into *stacks*. You can flip through a stack in order, or jump directly to the card or stack you need—as long as the person who created the stack remembered to *link* related pieces of information. Cards can have pictures, text and buttons on them.

HyperCard is often used primarily for educational presentations—especially complex multimedia ones that

include information on CD-ROMs or laser disks—and to created prototypes of programs that will ultimately be written in more complex programming languages. Commercial HyperCard stacks haven't been very successful—probably because HyperCard is so slow—it takes at least a second to tab from one field to another.

HyperCard is very simple to use. You can take an existing stack and copy selected cards and buttons from it to create something new without having to learn anything about scripting (programming). Even scripting isn't that hard. A dabbler can learn enough in a few evenings to make some simple tool that exactly fits her or his needs—although debugging it may take a while, and the fine points of design take much longer to master.

Because its simplicity limits HyperTalk as a programming environment, it's designed so you can add on *external commands* (more commonly known as *x-commands* or XCMDs) and *external functions* (more commonly known as *x-functions* or XFCNs)—compiled routines written in C or Pascal that do things HyperTalk can't do (or that do them faster).

learning HyperCard *(Ed Allen/ND)*

Danny Goodman's *Complete HyperCard Handbook* ($30) became an instant bestseller back when it was the only book on the subject. It's still a very good book for beginners, with thorough tutorials and detailed explanations starting at square one, but it's a little on the wordy side to be a great reference. For that, turn to the *Script Language Guide*. (It's part of Claris's HyperCard Development Kit, which costs $200 and includes all five levels of HyperCard plus 22 stacks of examples, XCMDs, ready-made buttons and other raw materials.)

If you can't bring yourself to spend that, try *HyperTalk 2: The Book* ($30). Coauthored by HyperTalk creator Dan Winkler, this is the book to buy if you want to learn

scripting inside out. Another good resource is the Cobb Group's *Inside HyperCard*, a 16-page monthly collection of HyperTalk scripting tips ($70 per year/$90 outside the U.S.). User groups, online services and Heizer Software offer stacks, scripting tools and a way to distribute stacks you want to share with others.

Often the hardest part of writing a stack is making it easy to use. For good ideas on that, check out the *HyperCard Stack Design Guidelines* ($19, from Addison-Wesley). They were prepared by the Apple employees who helped make the early sample HyperCard stacks look so good. For writing XCMDs or XFCNs, the only available guide is Gary Bond's *XCMDs for HyperCard* ($25). It hasn't been updated for a long while, but it's still the best source.

You don't have to create XCMDs yourself—Claris includes some in the HyperCard Development Kit. Many more are available from user groups or online services, and there are good commercial collections as well, like 101 Buttons and Scripts for HyperCard and HyperArrays. A $150 utility called CompileIt! lets you create XCMDs and compile them for use in HyperTalk or SuperTalk scripts—without knowing a more advanced programming language. And you can use it to turn certain scripts into XCMDs so they'll run faster.

You can also learn a lot by looking at other people's scripts—but you need a full-fledged version of HyperCard for this, not just Stack Runner. You may need to set the stack's user level to 4 for authoring or 5 for scripting. To do that, press ⌘M. When the dialog box appears, type *set userlevel to 4* (or to 5) and press Return.

To see the script behind any button or field, select the button or field tool, double-click on the field or button, and click *Script* in the dialog box that appears. To make buttons' invisible frames appear, press Option⌘. To get the script for a stack, hit Option⌘S; for a background,

Option ⌘ B; for a card, Option ⌘ C. To see the menu bar when you're in a stack that doesn't have one, press ⌘ Spacebar (it toggles the menu bar on and off).

SuperCard *(ND/SA/Steve Michel)*

SuperCard (written by Bill Appleton for Silicon Beach) lets you do color, graphics that aren't just bitmaps, cards of any size, and simple animation. The programming environment is more powerful than HyperCard's, and it works the way programmers expect: you write in a program editor and then run your creation as a stand-alone application.

Version 1.6 ($300 list) is System 7 savvy and 32-bit clean. Like HyperCard, Version 1.6 lets you program Apple Events. But SuperCard has some problems: it still isn't fast, and large cards—especially those with color bitmaps and a lot of buttons and fields—take a long time to load. (To hide some of this sluggishness from the user, SuperTalk lets you open a window invisibly while a user is reading the prior card, so it's ready to display quickly.) Craig Ragland's *Inside SuperCard* ($23) is the only book that covers version 1.6 (as of this writing).

HyperCard vs. SuperCard *(ND)*

Choosing between HyperCard and SuperCard is not as simple as it once was, because the two differ less than when SuperCard first appeared. HyperCard still doesn't include color at this writing, but it probably will by the time you read this. Developers once chose SuperCard to create applications that would run by themselves (on Macs that didn't have SuperCard), but they now can license Stack Runner and include it with their stacks, so they'll run on machines that don't have the full-blown version of HyperCard.

Some people feel more at home working in SuperTalk, especially if they have programming experience. But

novices find SuperTalk more difficult to learn than HyperTalk.

Probably HyperCard's biggest advantage is still the simple fact that everyone who has bought a Mac since 1987 has received at least some version of HyperCard as standard issue, although early versions of it will probably have trouble running stacks written with version 2.

There is a third choice, Spinnaker Software's Plus ($500), whose main claim to fame is that there's a companion PC version. If you need to create an application that works on both Macs and PCs, check this one out.

C *(PH/Greg Dow/ND)*

In the early days of the Mac, Apple touted Pascal as the language of the future, and the one to use on the Mac. But today, nearly all Mac applications are written in C (or its variant, C++). C's approach to programming is *object-oriented.* (We'd define that term for you, but even computer-science experts have a hard time agreeing on exactly what it is.)

If you think of a program as a series of sentences, the C language has strict rules for how paragraphs are organized and the order of paragraphs in chapters. The vocabulary for C is surprisingly small; you'll probably only use about two dozen C words in your programs. Learning C isn't difficult, but writing correct programs often frustrates beginners, because the smallest mistake forces you to edit the program and try again.

To learn C, you need a compiler. The two most popular ones are Apple's MPW C (available through APDA) and Think C from Symantec. At $300 list, Think C is much less expensive and much easier to learn—and just as powerful. It includes a version of C++ and an *object class library,* which gives you a head start in learning object-oriented techniques.

As for instructional materials, absolute beginners should start with *Learn C on the Macintosh* ($35) by Dave Mark. It includes an abridged version of C that will run on any Mac from a Plus on that has at least a meg of memory. If you know C but not how it interacts with the Mac Toolbox, try *Macintosh C Programming Primer* by Mark and Cartwright Reed ($27).

Prograph *(Bill Hensler)*

Prograph 2.5 ($500 list) bills itself as an *object-oriented graphical dataflow language.* Computer techies have seen this hype from many sources over the years, none of which have been able to live up to their own press releases. But Prograph is a different story.

Combining graphics with object-oriented programming lets Prograph reach areas untouched by most languages. Adding dataflow means that Prograph should be able to handle any problem C can, and a few that would be too complex to even consider in a text-based language. Prograph's debugging environment also goes beyond what you find in other languages.

Prograph was the first graphical language that let me test out general-purpose algorithms right from a text-based language book. Anything you can do in BASIC, you can do in Prograph, which has both an interpreter and a compiler.

Prograph's ease of use encourages experimentation in your code and lets you take a layering approach to your programming, starting with the simplest ideas and slowly, interactively, sculpting those ideas into solutions.

ResEdit

resources *(SA/Michael Bradley/Derrick Schneider/AN)*

One of the things that makes Mac programming superior is its use of *resources*. Simply put, resources are items that can be used over and over again in different parts of a program. The various pointer shapes are a kind of resource, as are icons, dialog boxes and patterns.

A Mac program might say something like *get dialog box #7 and insert #14 in it and the text from string #347*. So the appearance of a program can be changed just by changing its resources. This makes it relatively simple to do a foreign-language version, for example, because all you have to do is translate the resources (the text in dialog boxes and on menus). For more about customizing resources, see the next few entries.

Resources on the Mac are identified by four-letter names (although some are three letters followed by a space). Some are all caps, and some are all lowercase (there's no functional difference between them). The most common ones are:

ALRT	alert boxes—the boxes themselves, not the contents
CODE	the instructions a program executes
CURS	pointer shapes (the name is short for *cursors)*
DITL	*dialog item list*—text in alert and dialog boxes
DLOG	dialog boxes—the boxes themselves, not the contents
FKEY	Fkeys
FOND	font family information
FONT	font characteristics
ICN#	icon list
ICON	icons

MENU	menu information
snd	sound
STR#	text of screen messages
XCMD	external commands included in HyperCard, MicroPhone and other programs

using ResEdit *(Derrick Schneider/ND/SA/AN)*

ResEdit (pronounced *REZ-ed-it*, short for *res*ource *edit*or) is a utility program from Apple that lets you change the *resources* (explained in the previous entry) that Mac programs—including the System and Finder—use. ResEdit is available free from online services and for a small fee from user groups.

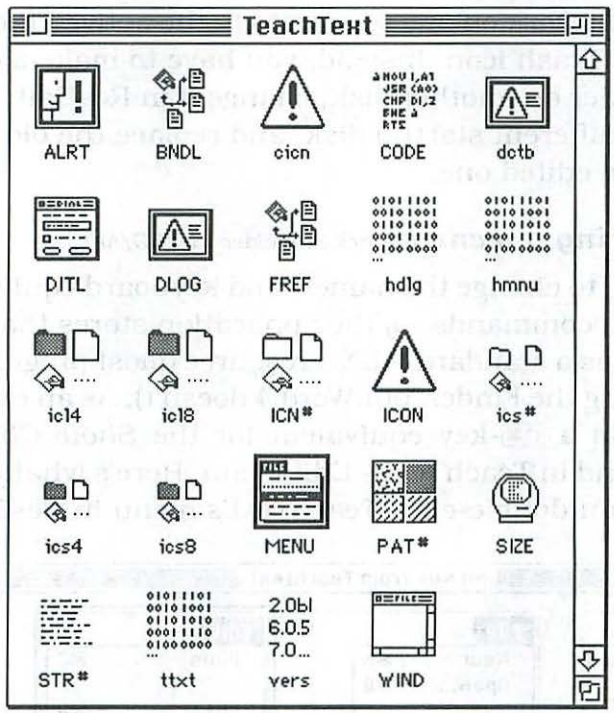
Because it was originally intended for programmers (and still is, primarily), ResEdit lacks much of the friendliness of most Mac software and has a reputation for being a heavy-duty, hackers-only program. But with just a bit of instruction, almost anybody can use ResEdit to customize their programs. The few tips below give just a taste of what you can do. For an inspiring, readable 220-page guide, see *Zen and the Art of Resource Editing* ($25), written by a bunch of BMUG members—including Derrick, who helped update this section.

Since you typically use ResEdit to alter your System and Finder, a mistake can damage one of those important programs and leave you dead in the water. So before you use ResEdit on any program, make sure you have a copy or two of it handy, in case you destroy the one you're changing.

When you launch ResEdit, a box appears, from which emerges a witless (or mildly deranged) jack-in-the-box. Click in the box to make it disappear, and ResEdit presents you with an Open dialog box from which you select the file whose resources you want to edit. You can select items by typing as many letters of their names as are

required to identify them—the same way you do in any Open dialog box.

When you select a file, a window opens that shows what types of resources are available in the file. The way TeachText, the program that lets you read Read Me files, looks when you open it inside ResEdit is shown below.



Just double-click the resource type, and then the specific resource you want to change (you may have to use trial and error). Once you've opened the right one, edit in the window that opens. When you're satisfied with the changes, save, close the nested windows in turn, and quit ResEdit. (If you want to undo all the changes, select *Revert File* from the File menu instead of saving.) You can edit virtually anything, including menus (described below) and icons.

use the current version *(ND)*

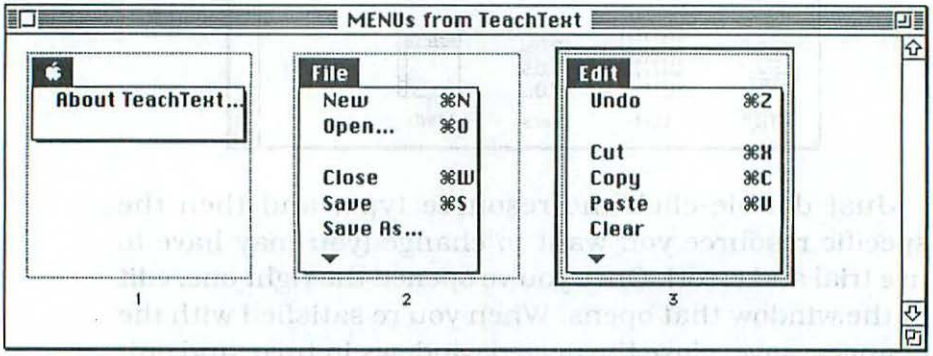
Like many other tools, ResEdit changes periodically to work better with upgrades of the system software. At this writing, the current version is 2.1.1, which works with System 7 and with MultiFinder in System 6.

changing Finder resources *(ND/Derrick Schneider)*

You can't work on any resources in the active Finder file, like the Trash icon. Instead, you have to make a copy of the Finder on another disk, change it in ResEdit, restart from a different startup disk, and replace the old Finder with the edited one.

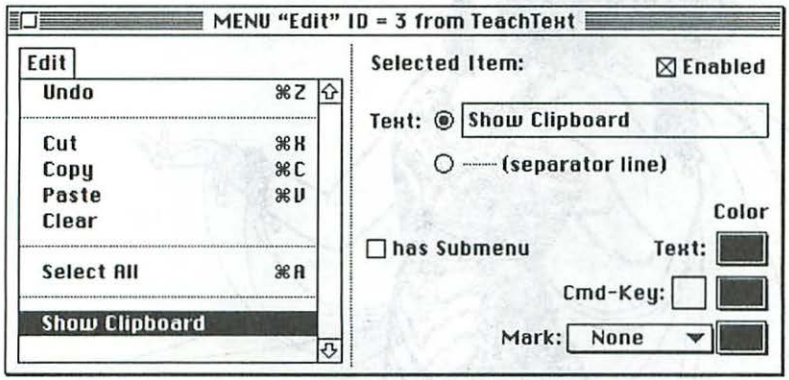
altering a menu *(Derrick Schneider /SA/ND/AN)*

It's easy to change the names (and keyboard equivalents) of menu commands—*if* the application stores that information as a standard MENU resource (most programs do, including the Finder, but Word 4 doesn't). As an example, let's add a ⌘-key equivalent for the *Show Clipboard* command in TeachText's Edit menu. Here's what you see when you double-click TeachText's menu in ResEdit:



When you double-click on the Edit menu, a window like the one at the top of the next page opens where you can make changes. Click the *Show Clipboard* command, and a text box labelled *Cmd-Key* appears. Type the

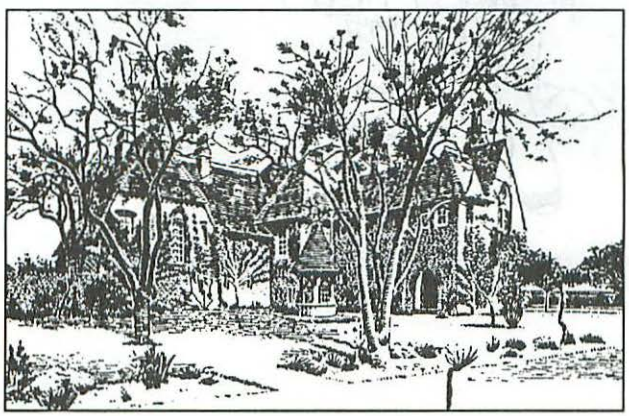
character you want for the keyboard shortcut into it (cap or lowercase, it doesn't matter—it still shows as a cap in the menu).



That's it. Now just click your way out of ResEdit, closing all the windows and saving the changes before you quit. When you get back to the Desktop, the Edit menu will be revised.

viewing PICT resources (SA)

When you view a PICT resource in ResEdit, you can't resize the display window, which means you can't see all of a large picture. To view the entire thing, copy it and paste it into a desk accessory that can handle graphics at full size.



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Chapter 20

Where to find good information and inexpensive software

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User groups and commercial seminars 991

Macintosh Bible Software Disks.....995

Magazines and newsletters

the big three (AN)

The three major Mac magazines are (listed in chronological order of when they were founded, to avoid even the slightest hint of favoritism) *Macworld* ($4 an issue, $30 a year), *MacUser* ($3 an issue, $27 a year) and *MacWeek* ($6 an issue or $100 a year, but free to qualified subscribers—and since you buy an average of ten Macintosh systems a month, you'll qualify without any problem).

All three of these magazines are jam-packed with useful information, but rather than my spending a lot of time describing them here, why don't you just pick up a copy or two of each? They're definitely all worth checking out, and for an investment of a few dollars, you'll know much more about which one(s) you like best than you'd get from reading my opinions.

Cobb Group newsletters (ND)

The Cobb Group publishes several excellent monthly newsletters for Mac users. *The Mac Authority* ($50 a year) contains general Mac techniques and tips. Three others focus on popular Microsoft products: *Inside Word* ($60 a year), *Excellence* ($60 a year) and *Inside Microsoft Works* ($50 a year). *Inside HyperCard* ($70 a year) is aimed at stack developers.

Macintosh Product Registry (AN)

This quarterly survey of Macintosh products contains listings (provided by the vendors themselves) that are close to exhaustive; if you need that sort of information, it's a valuable resource. It costs $40 a year or $15 an issue.

Nautilus (ND)

Nautilus is a $35-a-year "magazine" that appears monthly on CD-ROM disk. It's a good way to get big clip art and

sound files that would cost a fortune to download from an online service, demo versions of software, upgrades for popular programs (including system software—one subscriber was delighted to receive System 7.1 even before his local user group did) and shareware from international bulletin boards. It's a little hard to find your way around *Nautilus*, but maybe it will mature with the medium.

Books

✎ two small books (SA/AN)

mostly for beginners

The Little Mac Book ($15) is a best-selling quick-reference guide for beginners or occasional users; its 100 pages cover just enough of what you need to know to get started and keep moving for a while. *The Mac Is Not a Typewriter* ($10) is a 70-page roundup of word-processing versus typewriting rules (no double spaces after periods, don't use spaces to align things, and so on). Both were written by Robin Williams (not the comedian, of course—she's a graphic-design instructor at a college in northern California) and are published by Peachpit Press.

✎ Macworld Complete Mac Handbook (ND)

mostly for beginners

Jim Heid, who writes introductory articles for *Macworld's* less-experienced readers, has assembled a series of them into this solid $27 book. It covers 40 general topics like system software, buying hardware, CAD and PostScript. The detailed and attractive technical illustrations are especially illuminating.

✎ The 1993 BMUG Shareware Disk Catalog (ND)

bargain

This $23, 704-page directory (published by Addison-Wesley) catalogs the 340 disks'-worth of freeware and shareware in the library of BMUG, a large user group. Even if you're not planning to buy any of these programs from BMUG, the brief descriptions (and compatibility details) can help you find useful software online or at your local user group.

InitInfo (AN)

This guide to *inits* (better known as *extensions)* is put together by Gary Ouellet and Glenn Brown and is published by Baseline Publishing. It functions as a clearinghouse on bugs, conflicts and other known problems, and summarizes them in useful charts. It's frequently updated and you can download a demonstration version from CompuServe (Gary's address is 73277,2757; Glenn's is 73777,1142). All in all, this is a much-needed and quite useful little booklet (and service).

User groups and commercial seminars

what user groups are (AN)

User groups are clubs made up of people who are interested in computers in general, a particular kind of computer, a particular kind of software or even an individual program. They're typically nonprofit and independent of any manufacturer or publisher.

User groups are an excellent source of good information—which isn't surprising, since sharing information is their main purpose. Nowhere else are you likely to find so many dedicated people eager to help you solve your problems, none of whom would dream of charging you a nickel for it. (On the other hand, a lot of their opinions and recommendations have to be taken with a grain of salt.)

User group meetings are usually free and open to the public. Joining the group normally costs somewhere between $20 and $60 a year and gives you access to the group's library of public-domain software and shareware. Large groups often feature guest speakers from the computer industry who describe new products at their meetings, and also have subgroups called *SIGs* (which stands for *special interest groups)* for members with particular interests

or needs: beginners, developers, musicians, graphic artists, desktop publishers and so on.

Here's a description of what a typical (large) user group meeting is like. Before the meeting starts, people line up to buy disks and other items like modems that the group sells to members, usually at very low prices. The meeting begins with an open session where people can ask any question they have about any aspect of the Mac, and usually get a definitive answer from someone in the room. When the question-and-answer session is over, one or two guest speakers describe their products, using a Mac that projects onto a giant screen.

I vividly remember the night the ebullient Andy Hertzfeld (who wrote much of the code in the original Finder, as well as the software Radius distributes with its monitors) debuted a program of his called Switcher at a local user group. (Switcher was eventually bought by Apple and became the basis for the part of System 7 that lets you have two applications open at the same time.) When the display on the big screen switched from the first open application to the second, the audience literally leapt to its feet and cheered. (No lie.)

Unless you live in a very remote area, finding a local user group shouldn't be hard—especially if there's a college or university nearby. Either check with an Apple dealer (any good one will know all the local user groups) or call 800 538 9696, which is Apple's user group hot-line (you give them your zip code and they give you the names and numbers of up to three user groups in your area). If you can't find a group in your community, get together with some other Mac users and start one of your own.

BCS *(AN)*

There are more than forty SIGs in the country's largest user group, the Boston Computer Society, and each of them

publishes a newsletter (in addition to BCS's own slick magazine). When you join BCS (for $40 a year), you get to choose two SIGs to belong to (more than that cost extra). BCS's Mac SIG has more than 10,000 members and its newsletter, *The Active Window*, is excellent.

BMUG *(AN)*

BMUG was originally called the *Berkeley Macintosh Users Group* and *BMUG* was just its nickname. But the IRS considers a single-product or single-brand user group a promotional activity of the company, so to preserve the group's tax-exempt status, the name had to be changed to simply *BMUG*.

As of this writing, membership in BMUG costs $40 per year ($60 a year for families); included in the price is a semiannual "newsletter" that runs to hundreds of 8½ x 11 pages. The group maintains an extensive public-domain and shareware library and also publishes, on CD ROM, a comprehensive collection of noncommercial software.

for the visually impaired *(Jim Norrena)*

Founded in 1967, the National Federation of the Blind in Computer Science is a user group for the visually impaired that helps members find appropriate resources for both Macs and PCs. Membership (only $5 per year) includes a twice-yearly newsletter that's available on cassette. You can reach them at the National Federation of the Blind, 1800 Johnson St, Baltimore MD 21230; 410 659 9314, fax: 410 685 5653.

APDA *(ND)*

APDA started out as a sort of user group—the Apple Programmers and Developers Association. Now it's an Apple service that provides tools for programming, including languages, utilities, books and training. Call for the free catalog: 800 282 2732, or, in Canada, 800 637 0029.

The Macintosh Survival Course *(Michelle Buroker)*

A New Jersey company called Data-Tech Institute (which also goes by the name of the Technology Interchange Group) offers a two-day workshop at sites around the US. Called The Macintosh Survival Course, it covers common Mac hardware and software problems. For $800, you receive a workbook, a Mac tool kit and a headache from covering an overwhelming amount of information in a short time.

very bad feature

To get the most out of the class, you should be very familiar with how your Macintosh operates. The workbook is largely in outline form and is a compilation of information you can obtain from other, more comprehensive sources. Considerable time is spent showing how Norton Utilities can solve most of your software problems. But this program is so self-explanatory and straightforward that you can easily master it without a class to show you how.

One useful aspect of the seminar is a group workshop that gives you the opportunity to disassemble a Macintosh and learn about what's inside. You even learn how to upgrade your computer's RAM. Unfortunately, the hands-on time is limited, because four people are assigned to each computer.

important warning

I'd only recommend this course if you want a little information about a lot of data recovery and troubleshooting techniques, have an extra $800 lying around and just can't force yourself to read the books and manuals that cover the same information more thoroughly and succinctly.

very hot tip

[$800 buys a lot of information in books, magazines and newsletters and at user groups, and it's hard for me to imagine an $800 seminar being worth the money. After all, for the same amount of money, you could buy at least ten hours of the services of an expert computer consultant, who would focus on your problems and questions exclusively. That's almost as many hours as in this two-day seminar, and many computer consultants charge less than $80 an hour. If you want a group setting in which to learn

about the Mac, I'd recommend a beginner's SIG at your local user group.—AN]

The Macintosh Bible Software Disks (Fourth Edition)

This three-disk collection contains *more than three megabytes* of the best freeware and shareware utilities, applications, games, fonts, sounds, etc. One disk gives you the software necessary for connecting to America Online and five free hours of connect time. The other two disks are intended for your left and right brain. Here's what's on them:

The Left Brain disk

Address Book is a handy little database program (and desk accessory) for storing names, addresses and telephone numbers. If you have a modem, the program will also dial any phone number in its files at a click of the mouse.

Calendar is an elegant desk accessory that creates calendars for planning and scheduling.

Compact Pro compresses your files so they take less time to send over phone lines (and take up less room on disk). It will create compacted files that anyone can expand simply by double-clicking on them, without needing to have a copy of Compact Pro.

Dictionary Helper is a 1313-word file that, when you add to your spelling checker dictionary; greatly reduces the number of "false alarms"—words that get flagged even though they're correct.

Disinfectant protects your disks against viruses.

Moire is a screen blanker that puts a moiré pattern on inactive screens.

myWord is a desk accessory for editing text.

PopChar helps you find characters that don't appear on the keyboard. It displays every character in the font you're using, so you can copy and paste the one you want.

Sav-O-Matic automatically saves your work (at whatever interval you specify, in whatever programs you want).

SuperClock! puts a small clock on the right side of your menu bar.

Super Ruler puts a ruler on your screen that you can use to measure anything on-screen, horizontally or vertically.

theTypeBook helps you create and maintain a reference book of fonts you own.

Z Term is a fairly powerful communications program you use with your modem to connect to online services or BBSs (bulletin board systems).

The Right Brain disk

Charlie is tic-tac-toe played against the computer on a giant 18 x 30 grid.

Columns is a game that's reminiscent of the popular Tetris.

CryptoSolve lets you solve or create cryptogram puzzles.

DeskCritters includes two extensions. One stamps footprints randomly across your screen; the other places a pair of cartoon eyeballs on the menu bar that follow the pointer wherever it goes.

GNU Chess is the Mac version of a popular mainframe chess game.

four fonts: *Author (which looks like this),* Black Chancery (which looks like this), ***Crilee (which looks like this)*** and Remon Note (which looks like this).

Hangman Plus is an on-screen version of the classic game.

LightningPaint is a bit-mapped paint program.

MineSweep is a game that challenges you to find mines that are hidden in a checkerboard-like grid.

SoundMaster helps manage sounds and lets you assign them to various Mac activities (startup, the beep, inserting or ejecting a disk, etc.). It comes with 13 sounds, everything from a bomb exploding to a sexy voice saying "here we go again."

This three-disk *Fourth Edition* of *The Macintosh Bible Software Disks* costs just $25. If you'd like to take a look at it, use the order form at the back of the book (or, if someone else has beat you to it, send $25 to Peachpit Press, 2414 Sixth St, Berkeley CA 94710). When you order directly from Peachpit, the disks come with an unconditional money-back guarantee.

Appendix A

Glossary of basic Mac terms

The definitions in this glossary only apply to the Mac. They may not be accurate if you try to apply them to other computers or—heaven forfend!—to the world outside computers. Very basic terms (like mouse *and* keyboard*) are omitted.*

When a term that's defined below occurs in the definition of another term, we usually put it in italics—so you know you can look it up if you don't know what it means (but we don't do that for the most common terms, like file *and* folder*). Italics are also used for sentences that show how the word is used (see* algorithm *for an example). Words are alphabetized as if spaces and hyphens didn't exist; thus* copying *comes before* copy protection *and* E-mail *comes between* em *and* em dash.

Although many people's suggestions are incorporated into these definitions, the final wording is mine, and I'm to blame for any imprecision, confusion or bad jokes.—AN

accelerator board
A *board* containing a faster CPU chip and/or more memory and/or other electronic wizardry to speed up the operation of a computer.

access privileges
The ability to view or change a file or folder that's being shared over the network by an AppleShare *file server* or a Mac using System 7's *file sharing*. The privileges are assigned to other users on a *network* by the shared item's *owner* or by a network administrator.

access time
How long it takes for a hard disk (or similar device) to find data stored on it.

active program
The currently selected program, whose menu titles appear in the menu bar at the top of the screen and, in System 7, whose name is checked in the Application menu. Several programs can be *open* at once, but only one can be active at a time.

active window
The currently selected window, where the next command (or anything you type from the keyboard) will be applied. The active window is always on top of any overlapping windows, its *title bar* is *highlighted*—that is, there are six horizontal lines on either side of the title—and its *scroll bars* are gray (when all its contents won't fit).

***ADB** (pronounced as separate letters—needless to say)*
The *Apple Desktop Bus*—a standard for connecting peripheral devices like keyboards and mice to all Macs since the SE (as well as to the

Apple IIGS). The connections are different from those on the Plus and earlier Macs.

***AI** (pronounced as separate letters)*
Short for *artificial intelligence*, this term is applied to computer programs that can learn from experience.

Alarm Clock
A standard Apple-supplied *desk accessory* that lets you sound an alarm at a given time. (If the Mac is off at that time, you find out about the alarm when you turn the Mac back on.) You can also use it to set the Mac's system time.

***alert box** (or simply **alert**)*
A *box* that appears unbidden on the screen, announced by one or more beeps, to give you information. Alert boxes don't require any information back from you (although you may have to click a button like *OK*, *Cancel* or *Restart*). A *bomb* is one example. Also called a *message box*, although *alert box* is the correct name. Some people call them simply *alerts*.

algorithm
The precise sequence of steps required to do something. The first step in programming is figuring out the algorithm. *Both programs produce the same result, but because they use different algorithms, the second one is much faster.*

Algorithmically derived type styles are ones where the computer calculates the degree of slant (for oblique type styles) or the amount of thickening (for boldface type styles), rather than a human being designing a *cutting*.

alias
A small file (usually about 2K) that serves as a remote control for opening another file, folder or disk. You can put an alias anywhere—on the desktop, in a folder or on the menu—and it will find and open the original when double-clicked, selected from the menu, or opened in any other way.

alphanumeric
Letters and numbers. Punctuation and symbols are not alphanumeric characters.

alpha tester
A person, employed by the company developing a product, who tries to discover *bugs* in it. Compare *beta tester*.

alpha testing
Early *debugging* of a product within the company developing it. It's followed by *beta testing* (unless the alpha testing is really disastrous).

alpha version
A version of a program at the point at which it's in alpha test. There are usually several alpha versions. Compare *beta version* and *release version.*

analog-to-digital conversion
An electronic process for translating analog information (like that produced by a microphone or VCR) into numbers that can be stored and manipulated by the computer. Digital-to-analog conversion reverses the process, so the digitally stored sound or image can be reproduced.

antialiasing
Making text or graphics look smoother by applying shades of gray (or a color) to its edges (this requires a gray-scale or color monitor). Antialiased fonts are easier to read than plain black characters on a white background.

Apple Events
A System 7 feature that lets you use the functions of one program on files created by others (in software that's designed to work that way). For example, you might use a spreadsheet program to make a chart out of the data in a database program.

menu
The Apple menu, which is available on the *desktop* (that is, in the *Finder)* and from within most applications; its title is an that appears at the extreme left end of the menu bar. Under System 7, you can make any file or folder appear on the menu by adding it to the *Apple Menu Items folder;* under System 6, the menu only gives you access to *desk accessories.* With either version, you also get information about the current application.

Apple Menu Items
A folder inside the *System Folder* where you keep desk accessories and anything else you want to appear on the menu.

AppleShare
1. A *Chooser extension* that lets you access shared files on other networked Macs or AppleShare *file servers.*
2. Software that turns a Macintosh with a hard disk into a *file server,* allowing other Macs on the same *network* to access the files kept on it.

AppleTalk
The Mac's built-in networking software, and the *protocols* it uses. Networks using those protocols are also called *AppleTalk*. Originally, *AppleTalk* referred to the cabling as well, which is now called *LocalTalk*.

***application** (or **application program**)*
Software that does relatively complex tasks and that lets you create and modify documents. Some common types of applications are word processors, spreadsheets, databases, graphics programs, page layout software and communications programs. All programs are called *applications*, except utilities and system software.

Application menu
In System 7, the menu at the extreme right end of the menu bar that lets you switch between programs (and lets you hide the windows, etc. of programs you're not using at the moment). The menu's icon changes to match whichever program is currently active.

arrow keys
On the standard *ADB keyboard*, four keys (indicated by ↑, ←, → and ↓ in this book) that move the *insertion point*, move you through *list boxes*, etc.

arrow pointer
The basic shape the *pointer* takes—a left-leaning arrow that looks like this:

ascender
The part of lowercase letters like *b*, *d*, and *l* that extends above the *x-height*. Compare *descender*.

***ASCII** (ASK-ee)*
The *American standard code for information interchange*, a system for referring to letters, numbers and common symbols by code numbers. The ASCII standard is widely used by small computers like Macs and PCs, and is useful for transferring files between them. On the Mac, ASCII files are usually referred to as *text files*.

***A/UX** (pronounced as separate letters)*
A version of *Unix* designed for use on the Mac by Apple.

backbone
A type of *network configuration* in which each *node* has its own branch off a main cable (like rooms off a hall). Compare *daisy chain* and *star*.

background printing
A feature that allows you to keep using your Mac while it's sending a document to the printer. See also *print spooler.*

Backspace
What the Delete key is called on some older keyboards. (Both keys do exactly the same things.)

backup
A copy of a program or document that you can use if the original is destroyed. To *back up* is to make a copy.

Balloon Help
A feature of System 7 that automatically displays cartoon-like message balloons that explain items on the screen when you point to them with the mouse. (You turn it on or off from the *Help menu.)*

baseline
The imaginary line on which the letters of a font sit (only *descenders* extend below it).

BASIC
A *high-level programming language* that's relatively easy to learn but is also relatively lacking in power and sophistication. The name is short for *beginner's all-purpose symbolic instruction set.*

batch mode
When a spelling checker (or any other kind of program) processes an entire document (or some part of it) when you're done inputting data, instead of checking you as you input the data. Compare *interactive mode.*

baud rate
A measure of how fast data is transmitted—by a modem, for example—usually expressed in *bits per second (bps).* (In some circumstances, there's a difference between bits per second and the baud rate, but for all practical purposes you can consider them to be the same.) The most common baud rates are 1200, 2400, 9600 and 14,400 bps. The term comes from the name of a communications pioneer, Baudot.

BBS
Short for *bulletin board system.*

benchmark
A test (or set of tests) used to compare hardware or software speed.

beta site
A place where *beta testing* takes place. *We're a beta site for the new version.*

beta tester
A person, not employed by the company developing a product, who tries to discover *bugs* in it. Beta testers are almost never paid; they do it for the fun of being in on the development of the product and/or because their work requires that they know what's going on before the product is released. Compare *alpha tester.*

beta testing
Debugging a product with the help of people outside the company that's developing the product. Beta testing comes after *alpha testing* and before the *release version* is shipped.

beta version
A version of a program at the point at which it's in beta test. Usually there are several beta versions. Compare *alpha version* and *release version.*

Bezier curves *(BEZ-yay)*
Mathematically generated lines that can display nonuniform curvatures (as opposed to curves with uniform curvature, which are called *arcs).* Named after Pierre Bezier, they're defined by four control points. It's relatively easy to make Bezier curves assume complex shapes and to join their endpoints smoothly, which makes them particularly useful for creating the shapes of letters and other complex graphics.

bidirectional printing
Printing on both the forward and backward pass of the print head on a dot-matrix or inkjet printer.

binary numbers
The base-2 numbering system that almost all computers are based on, as opposed to the base-10, decimal numbers people use. The number 1 is the same in both binary and decimal, but 2 in decimal = 10 in binary, 3 in decimal = 11 in binary, 4 in decimal = 100 in binary, and so on.

bit
The smallest possible unit of information. It can represent only one of two things: yes or no, on or off, or—as it's expressed in the *binary* numbers used in computers—0 or 1. Short for *b*inary dig*it.* Also see *byte.*

bit map
An image made up of dots.

bit-mapped
Composed of dots.

bit-mapped font
A font that's made up of a pattern (map) of dots, and requires different maps to look right in different sizes. Also called a *fixed-size font* by Apple (and by nobody else). Compare *outline font* and *screen font.*

bit-mapped graphic
A picture or other graphic made up of dots rather than of objects. Typically produced by *paint programs.* Compare *object-oriented graphic.*

black-and-white
Said of a *monochrome monitor* (or video card) that can't display grays (or one on which you've turned gray-scale off temporarily).

block move
Cutting and pasting a large block of text.

board
A piece of fiberglass or pressboard on which *chips* are mounted. Also called a *circuit board.* The connections between the chips are normally printed with metallic ink—in which case it's a *printed circuit* (or *PC) board.* The main board in a computer device is called the *logic board* or *motherboard.* A board made to plug into a *slot* is called a *card.*

bomb
A *message box* with a picture of a bomb in it. It appears unbidden on the screen to let you know that a serious problem has occurred with the system software (in other words, that you've *crashed).* Bombs usually force you to restart the system. Compare *hang.*

booting
Starting up a computer by loading an *operating system*—in the case of the Mac, the System and either the Finder or a Finder substitute—into its memory. The more common Mac term is *starting up* or simply *starting.* (The name *boot* comes from the idea that the operating system pulls itself up by its own bootstraps—since it's a program that tells a computer how to load other programs, but loads itself.)

box
1. An enclosed area on the Mac's screen that doesn't have a *title bar* (and thus can't be dragged around). *Dialog boxes* and *alert boxes* are two examples. Certain kinds of boxes, like *list boxes* and *text boxes,* appear inside other boxes (in this case, inside dialog boxes). Compare *window.*

2. Any of various rectangular icons that control windows—like *close boxes, scroll boxes, size boxes* and *zoom boxes.*
3. A rectangular *button,* like a *checkbox.*

bridge
The most basic sort of connection between networks. Compare *gateway* and *router.*

buffer
An area of memory—or a physically separate memory *cache*—that holds information until it's needed. Buffers are used to speed up printing, redrawing the screen, etc. by providing a reservoir of information that's readily accessible to the printer or monitor, rather than allowing a bottleneck to develop between it and the Mac.

bug
A mistake, or unexpected occurrence, in a piece of software (or, less commonly, a piece of hardware). Bugs are distinguished from design flaws, which are intentional (that is, the programmer *put* them there).

Most computer programs are so complex that no programmer can test out (or even conceive of) all the possible situations they can generate. Thus most bugs aren't quite errors, but are rather untested paths, unanticipated contingencies. They're discovered when a user breaks new ground—for example, by using a particular series of commands in a particular order that no one has tried before (or in a particular set of circumstances that no one has been in before).

Bug is an old electronics and phone company term. It comes from the fact that bugs eating the insulation off wires was actually a common cause of problems in early telephone systems, until they figured out how to coat wires with stuff bugs don't like the taste of. (But they haven't figured out how to turn off pack rats. If you leave your car sitting outside for several weeks in the desert—on the outskirts of Tucson, say—pack rats will eat the insulation off the wiring.)

***bulletin board** (or **bulletin board system**)*
A computer dedicated to maintaining messages and software and making them available over phone lines at little or no charge. People *upload* (contribute) and *download* (gather) messages and files by calling the bulletin board from their own computers. Abbreviated *BBS.*

bus
A path over which electronic impulses travel between various computer devices. Examples include the Apple Desktop Bus *(ADB),* which connects

keyboards and mice to the Mac, and the *SCSI* bus, which connects hard drives and other peripherals to the Mac.

button

1. On the Mac's screen, an outlined area in a dialog box that you click on to choose, confirm or cancel a command. For example, when you quit from most applications, you get a dialog box that asks if you want to save the current document, and it gives you three buttons to choose from: *Yes*, *No* and *Cancel*. A button with a heavy border, which is activated when you hit Return or Enter, is called the *default button*. Also see *radio buttons*.
2. The switch on top of the mouse you use for clicking. When there's a danger of confusion with the first meaning of *button*, this one is called the *mouse button*.

byte

Eight *bits*. Bytes are typically used to represent characters (letters, numbers, punctuation marks and other symbols) in text.

cache *(cash)*

A place where you keep additional information. See *disk cache* and *buffer*.

CAD *(pronounced as a word, not separate letters)*

Computer-aided design, usually in areas of engineering, product design and architecture (*CAD* can refer to either hardware or software).

CAD/CAM *(CAD-cam)*

For *CAD*, see the previous entry. The *CAM* half stands for *computer-aided manufacturing*—computers and programs that run manufacturing machinery or even entire factories. (You seldom see the word *CAM* alone; it's usually combined with *CAD*.)

Calculator

A standard Apple-supplied *desk accessory* that simulates a simple calculator. You can cut and paste to and from it.

Cancel

A *button* that appears in most *dialog boxes*, giving you the choice of cancelling the command that generated the dialog box.

Caps Lock

A *modifier key* that, in addition to its normal function of making any letter you type a capital, can be used as part of a *keyboard command*.

card
A kind of *board* that plugs directly into a *slot*. Cards have connectors right on their edges, rather than at the ends of a cable.

cartridge drive
A drive that uses a removable *hard disk* called a cartridge. (SyQuest is the most common brand.)

CCD
A *chip*, covered with small light sensors, that's used to capture the image in scanners (and camcorders). The name stands for *charge-coupled device*.

CD ROM *(SEE-dee RAHM)*
A *compact disk read-only memory*—a kind of optical *storage* device (or medium) used on the Mac and other computers. Hyphenated when used as an adjective.

cdev *(SEE-dev)*
In System 6, a utility program that, like an *init*, must be placed in the System Folder to work. Unlike an init, it then displays an icon on the left side of the Control Panel, along with Apple's General, Keyboard and Mouse cdevs. *Cdev* is short for Control Panel *dev*ice. In System 7, they're called *control panels*.

character
The generic name for a number, letter or symbol. Included are "invisible" characters like Tab and Return.

character key
Any key that generates a *character*. Compare *modifier key*.

checkboxes
A group of boxes that work as *toggles*—that is, when you click on an empty checkbox, an *X* appears inside it, turning the option on; when you click on a checkbox with an *X* in it, the *X* disappears, and the option is turned off. Unlike *radio buttons*, any or all of a group of checkboxes can be on at one time.

chip
Silicon is a chemical element found in sand, clay, glass, pottery, concrete, brick, etc. A tiny piece of silicon (or germanium), usually about the size of a baby's fingernail, is impregnated with impurities in a pattern that creates different sorts of miniaturized computer circuits. This is a *chip*.

Chips are primarily used as *CPUs* or *memory* and are normally mounted in *DIPs* or *SIMMs*, or on *boards*.

chip family
A group of related chips, each of which (except, of course, the first) evolved from an earlier one. The *CPU chips* used in most Macs are members of Motorola's *68000* family.

Chooser
A *desk accessory* primarily used to tell the Mac which printer you want to use, what port it's connected to, whether background printing is turned on and whether AppleTalk is active or inactive. You also use it to gain access to a *file server* or another Mac's shared files.

Chooser extension
When you place one of these inside your System Folder, it displays an icon in the Chooser window. Chooser extensions normally control external devices like printers, or emulate them. Some examples are: the ImageWriter, StyleWriter and LaserWriter drivers that come with the Mac; FaxSTF's FaxPrint file, which lets you send a fax over a fax modem; and AppleShare, which lets you access other volumes on a *local area network.*

circuit board
See *board.*

clicking
Pressing and immediately releasing the mouse button. To *click on* something is to position the pointer on it and then click.

Clipboard
The area of the Mac's memory that holds what you last *cut* or *copied.* (If there's not enough room in memory for what you cut or copy, some of it is put on disk.) *Pasting* inserts the contents of the Clipboard into a document.

clock rate (or clock speed)
The operations of a computer are synchronized to a quartz crystal that pulses millions of times each second. These pulses determine things like how often the screen is redrawn and how often the *CPU* accesses RAM or a hard disk. The frequency of these pulses—how often they occur—is measured in *megahertz* (millions of cycles per second) and is called the *clock rate* or *clock speed.*

clone
A machine that's compatible with the IBM Personal Computer but that isn't made by IBM.

close box
A small box at the left end of the active window's title bar. Clicking on it closes the window. Compare *size box* and *zoom box*.

closing
On the *desktop*, closing a *window* means collapsing it back into an *icon*. Within an application, closing a *document* means terminating your work on it without exiting the application.

code
The actual statements or instructions in a program; what programmers produce. *Clean*, or *elegant*, code is well-written; *spaghetti code* is not.

Color Wheel
A segmented circle containing many colors that's used to specify the color of the *desktop*, highlighted text, etc. You get to the Color Wheel via System 7's Color and General control panels or the Color section of System 6's Control Panel.

command
The generic name for anything you tell a computer program to do. On the Mac, commands are usually listed on menus, or are generated by holding down the ⌘ (command) key while hitting one or more other keys. To choose a command from a menu, you drag down the menu until the command you want is *highlighted*, then release the mouse button.

⌘
Called the *command* key, this *modifier key* is used in combination with other keys to issue commands. For example, in most Mac applications, ⌘S saves the document you're working on. (On older keyboards, the command key doesn't have an apple on it, and thus looks something like this: ⌘.)

commercial
Said of computer products that are sold for profit through normal distribution channels, with the purchaser paying before taking possession of the product. Compare *shareware* and *public-domain*.

communicating
Transferring data between computers, either over phone lines *(telecommunicating)* or on a *local area network*.

compact Mac
A Mac (like the Classics or the Plus) with a 9" monitor built into the same box as the *CPU*. Compare *modular Mac* and *portable Mac*.

compiler
Software that converts the instructions of *a high-level programming language* into *machine language* and makes a separate file of them, so that they won't have to be reconverted each time the program is run (once compiled, the instructions run faster, but can't be modified). Compare *interpreter.*

compression
Reducing the size of files so they'll take less time to transmit via a modem, or so that more of them can fit on a disk.

configuration
1. The components that make up a particular computer system (i.e. which model of Mac and what *peripherals).*
2. The actual physical arrangement of those components (i.e. what's placed where).
3. The physical arrangement of *nodes* on a *network* (see *backbone, daisy-chain* and *star).*
4. The *software* settings that tell computer devices how to communicate with each other (as in *configuring your modem software).*

contiguous
Said of memory or storage space that's not split apart by other pieces of memory or storage used for other information. Compare *fragmented.*

control character
The combination of the Control key and one or more other characters. Control characters are widely used on the IBM PC, but the Mac mostly uses the ⌘ key for this purpose (although control characters are used in some Mac communications programs).

control key
A *modifier key* on *ADB keyboards* (but not on earlier Mac keyboards). Widely used in the world of the IBM PC, Control can be used on Macs as part of *keyboard commands* for menu commands or for *macros.*

control panel, Control Panel, Control Panels
In System 7, a *control panel* (small letters) is a utility that lets you set things like how loud the beeps (and other sounds the Mac makes) are, how fast the insertion point blinks, how fast you have to click in succession for the Mac to recognize it as a doubleclick, and so on. Control panels are kept in a folder called *Control Panels* (initial caps); one way to open it is by selecting *Control Panels* from the menu.

In System 6, control panels are called *cdevs*, and they're accessed through the *Control Panel* (capitalized, singular) command on the menu.

coprocessor
A chip that specializes in math, graphics, or some other specific kind of computation. When the *CPU* is given the kind of job the coprocessor specializes in, it hands the job off to it. The most common coprocessor chips used in Macs so far (the 68881 and 68882) both specialize in mathematical computation.

copying
Duplicating something from a document and placing the duplicate in the *Clipboard.* To do that, you select what you want to copy and then choose *Copy* from the Edit menu or hit ⌘C. Also see *cutting* and *pasting.*

copy protection
Any of many various schemes for preventing the unauthorized copying of software. They're all a pain (although to varying degrees) and are seldom used any more.

CP/M *(pronounced as separate letters—needless to say)*
An early *operating system* for personal computers on which *MS DOS* was modeled. (The name stands for *control program for microprocessors.)*

cps
Characters per second (used to describe printer speed).

CPU *(pronounced as separate letters)*
The *central processing unit*—the central part of a computer (or other computer device). It includes the circuitry—built around the *CPU chip* and mounted on the *motherboard*—that actually performs the computer's calculations, and the box in which that circuitry is housed. (Sometimes just the CPU chip itself is called the *CPU.)*

CPU chip
The brain of a computer (or other computer device); the main *processor chip* that actually does the computing. The *CPU chip* is the primary determinant of what software will run on that particular computer and, with the clock rate, determines how fast the computer will run.

crash
A noun and verb, both of which mean that your system has suddenly and unexpectedly stopped working, or is working wrong. You normally have to restart. Also see *bomb* and *hang.*

***CRT** (pronounced as separate letters—needless to say)*
A *cathode ray tube*—the display technology used on virtually all desktop computer monitors and television sets. On portable Macs, the most common technology is the *LCD*.

***curly quotes** (and **curly apostrophes**)*
Ones that look like this: " " ', rather than like this: " ' .

cursor
Unlike more primitive computers, the Mac has nothing called a *cursor* (although Mac *programmers* use the term; see the next paragraph). This clumsy and imprecise term is sometimes used to replace the more accurate terms *pointer* and *insertion point*. (*Cursor* is a Latin word that means *runner* or *messenger*.)

Mac programmers call the pointer the *cursor*—which doesn't make any sense at all, since the insertion point, not the pointer, is the equivalent of what's called the *cursor* on other computers. But, hey, that's why you use the Mac—so that all that nerdy computerese will be invisible to you.

cutting
1. Removing something from a document by selecting it and then choosing *Cut* from the Edit menu or hitting ⌘X. What you cut is placed in the Clipboard. Also see *copying* and *pasting*.
2. In type design, a type style (like italic or boldface) that was actually designed by a human being, rather than being derived *algorithmically* by the computer.

***DA** (pronounced as separate letters)*
The common name for a *desk accessory*.

daisy chain
A type of *network configuration* in which *nodes* are connected to one another in a chain (so that information has to pass through each node to get to the next). Compare *backbone* and *star*.

DAL
An *extension* that lets you access information from a database program on another kind of computer (like a mainframe) without having to know that program's commands. The name stands for *data access language*.

data
Data is the generic name for anything you input to a computer, or anything it outputs to you (except for *garbage*).

daughter board
A *board* that mounts on top of, and connects to, the *motherboard*. Often used for memory upgrades and the like.

debug
To search out *bugs* in a piece of software and eliminate them.

dedicated
Used for a specified purpose only. For example, your computer might be on a dedicated electrical circuit that's used only for the computer (no lamps, refrigerators or other electric appliances would be on it), or you might dedicate a phone line to your modem and/or fax.

default
What you get if you don't specify something different. Often used to refer to default settings (for example, the margins in a word processing program, or Speaker Volume on the Sound control panel).

default button
A *button* with a heavy border, which is activated when you hit Return or Enter.

defragmenting
The process of making *fragmented* memory, or a fragmented hard disk, capable of storing information *contiguously*.

Delete
This key deletes whatever you have selected, or the character to the left of the *insertion point*. On some older keyboards, Delete is labeled Backspace.

delimiter
A character used to separate chunks of information—particularly when exporting and importing database files, where delimiters are used to separate information into *fields* and *records*.

descender
The part of lowercase letters like *g*, *y* and *q* that extends below the *baseline*. Compare *ascender*.

deselecting
See *selecting*.

desk accessories
Small programs that are normally accessed from the menu (in System 7, they can be kept anywhere). Desk accessories can usually

only open one document at a time, and quit automatically when you close the document. Commonly called *DAs.*

(the) desktop
Apple's official definition for this term is: *Macintosh's working environment—the menu bar and the gray area on the screen.* But in common usage, it refers only to the Finder's desktop—that is, what the Mac's screen displays when you're in the Finder.

desktop file(s)
Invisible file(s) on every Mac disk that record information like the size, shape and locations of windows. There's one desktop file in System 6, two in System 7. Compare *directory.*

Desktop Folder
An invisible folder, containing all the files and folders stored on the Finder's desktop, that's automatically created on every disk by System 7. If you restart under System 6, the folder becomes visible, and you have to open it to see the files and folder that were on the desktop under System 7.

destination
What you call the folder into which (or the disk onto which) a file gets copied, moved, installed or received over a modem. Compare *source.*

device
A piece of computer hardware.

dialog box
A box on the screen requesting information, or a decision, from you. In some dialog boxes, the only possible response is to click on the *OK* button. Since this hardly constitutes a dialog, those are more often called *message boxes* or *alert boxes.*

digital-to-analog conversion
See *analog-to-digital conversion.*

dimmed
When something is *dimmed* (gray) on the Mac's screen, it means that you can't currently access it. For example, commands you can't choose (in a given context) appear dimmed on the menu. When you eject a disk, its icon is dimmed, as are all windows and icons associated with it. Also called *grayed* or *disabled.*

DIP
A *dual in-line package*—the form in which many *chips* are mounted to plug into a computer.

directory
An invisible file that keeps track of where various files are stored on a disk. Compare *desktop file(s).*

disabled
Another word for *dimmed.*

disk
A round platter with a coating similar to that on recording tape, on which computer information is stored magnetically (except for optical disks, which store information optically). Although the disk itself is always circular, the case it comes in is usually rectangular. The two main types are *floppy disks* and *hard disks.*

disk cache
An area of memory set aside to hold information recently read in from disk—so that if the information is needed again, it can be gotten from memory (a much faster process than getting it from disk). The size of the disk cache can be adjusted in the Memory *control panel.* (In System 6, it's called the *RAM cache,* and can be adjusted in the Control Panel's General *cdev.)*

disk capacity
The maximum amount of data a *disk* can hold. It's measured in *kilobytes* (K), *megabytes* (MB) or *gigabytes.*

disk drive
A device that reads information from, and writes information onto, *disks.* The two main types are *floppy disk drives* and *hard disk drives.*

disk window
The window that opens when you double-click on a disk's icon. Also called the *root directory.*

display
Another name for a *monitor.*

document
What you create and modify with an *application*—a collection of information, grouped together and called by one name, and saved as a *file* on a disk or treated as one in memory. Some examples are a letter, a drawing or a mailing list.

documentation
This term includes manuals, *online* tutorials and help files, reference cards, instructional audio cassettes and videotapes, and so on.

dogcow
A picture of a dog that appears in the LaserWriter's page setup option dialog box (it looks a bit like a cow as well). The dogcow demonstrates what certain options do by acting them out as you select them.

***DOS** (dahss)*
Short for *PC DOS* or *MS DOS*—the *operating system* used on IBM Personal Computers and compatible machines. (The *D* stands for *disk.)*

dot
Another name for a *pixel*, or for the smallest unit that makes up a *bit-mapped* character or graphic.

dot-matrix printer
A printer that forms characters out of a pattern of dots, the way the Mac forms images on the screen. Usually each dot is made by a separate pin pushing an inked ribbon against the paper. Apple's ImageWriter is one example.

dots per inch
A measure of screen or printer resolution; the number of dots in a line one inch long. Abbreviated *dpi.*

dots per square inch
A measure of screen or printer resolution; the number of dots in a one-inch square. Abbreviated *dpsi* or *dpi²*.

double-clicking
Positioning the pointer and then quickly pressing and releasing the mouse button twice without moving the mouse. Double-clicking is used to open applications and documents (when the pointer is an arrow) and to select whole words (when the pointer is an I-beam).

double-sided disks
Floppy disks that store information on both surfaces—top and bottom. There are two types currently in use: double-density floppies, which hold 800K, and high-density ones, which hold 1.4MB. Compare *single-sided disks.*

downloading
1. Retrieving a file from a distant computer and storing it on your own. Opposite of *uploading.*
2. Sending a font file or PostScript program to a laser printer.

dpi
An abbreviation for *dots per inch.*

dpsi, dpi²
Abbreviations for *dots per square inch.*

dragging
Placing the pointer, holding down the mouse button, moving the mouse and then releasing the button. If you place the pointer on an object, dragging moves the object. If you place the pointer where there is no object, dragging often generates the selection rectangle (in the Finder and in graphics programs, for example). If you place the pointer on a menu title, dragging moves you down the menu (and releasing the button when a command is highlighted chooses it).

DRAM *(DEE-ram)*
A *dynamic RAM* (memory) chip. *Dynamic* simply means it loses its memory when you shut the computer off *(volatile RAM* would probably have been a better name). Also see *SIMM* and *parameter RAM.*

draw program
A graphics program that generates *object-oriented graphics,* which are treated as units, rather than a series of dots. Compare *paint program.*

draw/paint program
A graphics program that combines the features of *draw programs* and *paint programs,* usually by putting *object-oriented graphics* and *bit-mapped graphics* on different layers.

drive
See *disk drive.*

driver
A piece of software that tells a computer how to run an outside device—typically a printer—or that emulates doing that (for example, it might tell the computer how to print a file to disk as if it were sending it to a printer).

Easy Access
An Apple *control panel* that helps people whose disabilities make it hard for them to use modifier keys or manipulate the mouse in the normal way.

Edit menu
In the Finder and in most applications, the third menu from the left on the menu bar. It typically contains commands for cutting, copying, pasting, undoing, etc.

eight-bit color
Said of images where each *pixel* has eight bits of memory assigned to it. Eight-bit color can produce a palette of 256 colors (or shades of gray). Compare *24-bit color.*

ELF
Extremely low frequency radiation, between 60Hz and 75Hz, which is generated by computer *monitors* and other devices that produce electric and magnetic fields. Compare *VLF.*

ellipsis
A symbol composed of three dots (...). When it appears after a menu item, it means that selecting the item won't immediately execute a command; you'll either get a *dialog box* asking for more information or a *message box* telling you something.

em
A space as wide as the size of type you're using is high (so if you're using 12-point type, an em will be twelve points wide). It gets its name from the fact that it's approximately the width of a capital *M.* Compare *en.*

e-mail
Electronic *mail;* messages sent from computer to computer over phone lines (or over a *local area network).*

em dash
A dash one *em* in length. It's often used instead of parentheses or commas to set off a separate thought—particularly in this book. Compare *en dash.*

en
A space half as wide as the size of type you're using is high (so if you're using 12-point type, an en will be six points wide). It gets its name from the fact that it's approximately the width of a lowercase *n.* Compare *em.*

encapsulated PostScript
See *EPS.*

enhanced resolution
Any of several printer technologies that give the appearance of higher-resolution output by smoothing *jaggies* and/or sharpening grayscale images.

encryption
Scrambling the data in a file to prevent unauthorized access.

en dash
A dash one *en* in length. It's used in ranges of numbers (1987–91) and as a minus sign. Compare *em dash*.

Enter
A key on the Mac's keyboard that doesn't generate a character and is used for different purposes by various applications. In *dialog boxes* and on the *desktop*, the Enter key usually has the same effect as the Return key.

error message
A message that tells you of a programming or communication error. It usually appears in an *alert box* and is accompanied by a sound.

EPS *(pronounced as separate letters)*
Encapsulated PostScript, a standard graphics format that consists of the PostScript code that tells the printer how to print the image and a PICT image that tells the screen how to display it. Compare *paint*, *PICT* and *TIFF*.

Ethernet
A very fast *LAN* cabling system developed by Xerox. Many companies now manufacture Ethernet components, and the Quadras come with Ethernet support built in (other Macs require special Ethernet cards or SCSI devices).

EtherTalk
The *AppleTalk* networking protocol, as implemented for *Ethernet* networks.

expansion card
See *card*.

expansion slot
A place in a computer where you can install a *card*. (Its name comes from the fact that it allows you to expand the computer's capabilities.) Also called simply a *slot*.

expertosis *(eks-per-TOE-sis)*
The tendency of experts in a field to lose sight of the needs, concerns and limitations of people who aren't experts in that field. On the Mac, expertosis most often manifests itself in unintelligible manuals, abstruse features and strange, uncommunicative names for things.

(This is my bid to insert a word into the English language, after years of envying Paul Krassner for *yippie*, Alice Kahn for *yuppie*, Jack Mingo for *couch potato* and Denise Caruso for *interCapped*. It does, after all,

describe a common phenomenon, and one that there's no other word for. Won't you help me in my quest by using *expertosis* whenever possible? I'll be eternally grateful.)

expert system
A program that simulates human expertise by using "rules of thumb" and the process of elimination to access an extensive database of facts. One valuable use of expert systems is to help with medical diagnoses.

extension
A file that loads automatically when the Mac starts up and that "adds functionality" to the system software. Also called a *system extension.* Called an *init* under System 6.

Extensions
A folder inside the System Folder where the active *extensions* are kept.

false alarms
Correctly spelled words a spelling checker flags as possible errors because it doesn't recognize them.

FatBits
A feature, originated by MacPaint, that lets you edit graphics in a magnified view, dot by dot.

fax modem
A type of *modem* that can send (and, in many cases, receive) faxes to and from fax machines or other fax modems. Unlike regular fax machines, fax modems can't (by themselves) fax paper documents—only disk files.

field
1. In *databases,* a specific portion of a *record.* For example, if the record is in a mailing list program, there will be—at least—a name field, an address field, a city field, a state field and field for the zip code.
2. *In the field* means anywhere but the factory where a computer—or any piece of hardware—is manufactured. *We've designed this system so just about any repair can be made in the field.*

file
A collection of information on a disk, usually either a *document* or a *program.* Although the information in a file is normally cohesive—that is, about one thing—it doesn't actually have to be; what makes it a file is simply that it's lumped together and called by one name.

file compression
See *compression.*

File menu
On the *desktop* and in virtually all applications, the second menu from the left. Within applications, it contains commands for opening, saving, printing and closing documents, quitting the application and so on. In the Finder, it contains commands for opening and closing windows, duplicating icons, ejecting disks, etc.

file server
A computer on a *network* that others on the network can access and get applications and documents from.

file sharing
A feature of System 7 that allows networked Macs to share each other's files across the network.

Finder
The basic program that generates the *desktop* and lets you access and manage files and disks. Together with the System file and the Mac's ROMs, it comprises what—on other computers—is called the *operating system*. There are also Finder substitutes, which perform the same basic tasks as the Finder (and usually give you other capabilities as well).

fixed-size font
Apple's name for a *bit-mapped font*. Compare *outline font* and *scalable font*.

Fkey *(EFF-kee)*
An obsolescent type of Mac command that's invoked by pressing Shift⌘ plus a number. They've largely been replaced by *extensions* and *control panels*. (Although their name is derived from *function keys*, Fkeys have nothing to do with the function keys that are labelled F1, F2, etc. on extended keyboards.) The standard Mac commands to eject disks (Shift⌘1 and Shift⌘2) and to save or print the screen (Shift⌘3 and Shift⌘4) are Fkeys.

flicker
Rapid pulsation of the image on a screen, visible to some people, as the result of the *refresh rate* being too slow.

floppy disk
A removable disk that's flexible (although the case in which the actual magnetic medium is housed may be hard, as it is on the 3.5" floppies used by the Mac). Compare *hard disk*. Also see *disk*.

floppy disk drive
A device for reading data from, and writing data to, *floppy disks*.

folder
A grouping of files and/or other folders that's represented by a folder-shaped icon on the *desktop.* (The equivalent on MS-DOS machines is called a *subdirectory.)*

font
A collection of letters, numbers, punctuation marks and symbols with an identifiable and consistent look; a Macintosh typeface in all its sizes and styles.

Font/DA Mover
A utility program used for installing, removing and moving *fonts* and *desk accessories* to and from *suitcase files* and the System file itself.

font family
A term that's sometimes used to refer to all the styles and weights (bold, semibold, bold italic, and so on) of a particular font.

footer
A piece of text automatically printed at the bottom of several pages (although the text may vary from page to page—as it would if it contained page numbers, for example).

footprint
The amount of space a device takes up on the surface where it sits (and the shape of that space).

format
The file structure that a particular document is saved in (e.g. *ASCII, PICT, EPS, TIFF).* Most applications can save documents in one or more standard formats as well their *native format.*

formatting
1. All the characteristics of text other than the actual characters that make it up. Formatting includes things like italics, boldfacing, type size, margins, line spacing, justification and so on.
2. Another term for *initializing* a disk.

fragmented
Said of memory or storage space that's split apart by other pieces of memory or storage used for other information. Compare *contiguous.*

freeware
See *public-domain software.*

freeze
Another term for a *hang.*

function keys
Special keys on some extended keyboards (both from Apple and other manufacturers) that are labelled F1, F2, etc. You can assign commands of your own choosing to them. Don't confuse them with *Fkeys.*

garbage
Bizarre and/or meaningless characters. When garbage appears on the screen, it means something has gone wrong somewhere.

gateway
One of the most intelligent connections between networks (it translates between different network protocols). Compare *bridge* and *router.*

Get Info window
The window that appears when you choose *Get Info* from the File menu (or hit ⌘I). It tells you the size of the selected file, folder or disk, when it was created and last modified, and where it resides. There's also a space for entering comments, and, in the case of a file or a disk, a box for locking and unlocking it.

Other options may also be available, depending on what you're Getting Info on. Get Info is used for changing how much memory is allocated for an application, changing the icon that's used to represent the file, turning off the Trash's warning message, and finding the original from which an alias was made.

gig
An abbreviation for *gigabyte.*

gigabyte
A measure of computer memory, disk space and the like that's equal to 1024 *megabytes* (1,073,741,824 *bytes),* or about 179 million words. Sometimes a gigabyte is treated as an even billion bytes but, as you can see, that's almost 74 million bytes short. Sometimes abbreviated *gig* (more often in speech than in writing). Compare *kilobyte* and *megabyte.*

GIGO *(GUY-go)*
Garbage in, garbage out. In other words, you're not going to get good information out of your computer if you put junk information into it. (Unfortunately, the opposite isn't always true. Sometimes you put good information into a computer and *still* get garbage out.)

glitch
Although sometimes used as a synonym for *bug*, *glitch* strictly means a sudden voltage surge or electromagnetic pulse that causes a piece of hardware to malfunction. More generally, *glitch* means a design flaw in hardware, or any suddenly occurring problem or interruption. It's not usually applied to software, but when it is, it means a design flaw and not a bug. (See *bug* for more on the distinction.) *Glitch* comes from the Yiddish *glitshen*, which means *to slip*.

glossary, Glossary
1. In English, uncapitalized, a glossary is a list of definitions like this one.
2. Capitalized, in Microsoft Word (and some other applications), a Glossary is a set of abbreviations you've linked to longer text entries. You type ⌂⌘Delete, followed by the abbreviation—*wds*, say—and Word automatically inserts the longer phrase—in this case, *wine-dark sea*. (You didn't know Homer wrote *The Odyssey* on a Mac, did you? Yes, it was the very early ½K Mac-edonia. Plato later perfected the mechanism that projected forms onto the screen.)

gradient
A smooth and even shift from one color or shade to another, through a continuum of intervening shades or colors.

grayed
Another term for *dimmed*.

gray-scale
Said of images that contain shades of gray as well as black and white, and to monochrome monitors that can display grays, rather than just black and white.

group
In *file sharing*, a collection of users on a *network* who share the same *access privileges*.

guest
In *file sharing*, someone who logs on to a *shared item*, but not as a *registered user*, and therefore gets the same level of *access privileges* available to everyone on the network.

hacker
Someone who enjoys fooling around with computers in a technical way, programming them and/or doing sophisticated things to the hardware. See usage note at *nerd*.

halftone
A way of rendering a *gray-scale* image (a photograph, say) as a pattern of black and white dots.

handshake
What computers do when communicating, in order to establish a connection and agree on *protocols* for the transmission of data.

hang
A kind of *crash* where the Mac ignores input from the mouse and the keyboard, usually requiring you to restart the system. Also called a *freeze*. Compare *bomb*.

hanging indent
Paragraph formatting in which the body of the paragraph is indented further than the first line.

hard copy
A printed version of something from your computer.

***hard disk** (or **hard disk drive** or **hard drive**)*
A rigid, usually nonremovable *disk*, and/or the disk drive that houses it. Hard disks store much more data and access it much more quickly than *floppy disks*. Also see *disk*.

hard hyphen
A hyphen that holds the words on either side of it together when it falls at the end of a line, rather than allowing the second word to drop down to the beginning of the next line. Often generated by pressing Option -.

hard space
A space that holds the words on either side of it together when it falls at the end of a line, rather than allowing the second word to drop down to the beginning of the next line. Often generated by pressing Option Spacebar.

hardware
The physical components of a computer system. Compare *software*.

head crash
A mechanical failure of a hard disk drive, in which the *read-write head* comes in contact with the surface of the *platter* itself (often physically damaging the head and/or the platter).

header
A piece of text automatically printed at the top of several pages (although the text may vary from page to page—as it would if it contained page numbers, for example).

Help menu
A menu that lets you turn *Balloon Help* on and off; with some programs, you can also use it to access other information. The menu's title is a question mark inside a balloon, and it appears near the right end of the *menu bar.*

hertz
One cycle, occurrence, alteration or pulse per second. Abbreviated *Hz.* The regular electrical current that comes out of a (US) wall socket is 60 Hz—that is, it alternates sixty times a second. Named after the great German physicist, Heinrich Rudolph Hertz (1857–94). Compare *megahertz* and *kilohertz.*

HFS
The Mac's current method of organizing applications, documents and folders on a Mac disk, in which files and folders can be *nested* (contained) in other folders. Short for *hierarchical file system.* Compare *MFS.*

high-density disks
Floppy disks that hold 1.4MB. Also see *double-sided disks.*

high-level programming language
A *programming language* whose instructions are relatively close to English, rather than to the *machine language* the computer understands.

highlighting
Making something stand out from its background in order to show that it's selected, chosen or active. On the Mac, highlighting is usually achieved by reversing—that is, by substituting black for white and vice versa, or by reversing colors.

hinting
Techniques for making the characters of an outline font look as good as possible when printed at low resolutions.

hot spot
The actual part of the *pointer* that has to be positioned over an object in order for a click to select the object (or have some other effect on it). The hot spot of the arrow pointer is its tip, and the hot spot of the crosshairs pointer is its center (where the two lines cross).

human interface
Another name for *user interface.*

Hz
An abbreviation for *hertz.*

I-beam
The shape ( ) the pointer normally takes when it's dealing with text. Also called the *text tool.*

icon
A graphic symbol, usually representing a file, folder, disk or tool.

idiot-proofing
Designing a product so that mistakes—or, to be realistic, the most *common* mistakes—users make won't harm them, their work or the product.

imagesetter
A high-resolution digital phototypesetting machine that's capable of producing graphic images as well as type. Many imagesetters are PostScript-compatible and can therefore serve as output devices for Macs.

ImageWriter
A dot-matrix printer made by Apple. Also see *LaserWriter* and *StyleWriter.*

incremental backup
A *backup* in which only the files changed since the previous backup are copied.

init *(in-IT)*
What System 6 calls an *extension.* It's short for *initialization* program.

initializing
Preparing a disk for use on the Macintosh. Initializing checks the disk to make sure the media is OK, divides it into *tracks* and *sectors* and sets up a *directory, desktop file* and the like. If a disk contains information, initializing will remove it. Disks can be initialized again and again. Also called *formatting.*

inkjet printer
A printer that forms characters and images with tiny jets of ink.

insertion point
The place in a document where the next keystroke will add or delete text. The insertion point is represented by a blinking vertical line and is placed by clicking with the *I-beam* pointer.

Installer
A program that installs (or updates) system software and large, complex applications.

interactive mode
When a spelling checker (or any other kind of program) interrupts you as you make a mistake, rather than checking over the entire document (or a part of it) when you're done. Compare *batch mode.*

interCapped
Denise Caruso's wonderfully useful term for words that are capitalized in the middle (like *SuperPaint).*

interface
See *user interface.*

interpreter
Software that translates the commands of a *high-level programming language* into *machine language* instruction by instruction, each time the program is run. This makes the program easy to modify, but it runs slower than when it's converted by a *compiler.*

interrupt button
One of the two buttons on the *programmer's switch.* It accesses debugging software. Compare *reset button.*

invisible files
Files that don't normally show up on the screen (they can be accessed with utilities like DiskTop and ResEdit).

item
A generic name for anything that can be represented by an icon in the Finder, like a disk, file, folder or the Trash.

jaggies
If we put even *one* picture in the glossary, it would be like opening the floodgates. So I'm not going to give in to temptation. But jaggies are so *easy* to illustrate and so *hard* to define. Well, here goes: When you enlarge *bit-mapped* characters, they lose their smooth curves (or what look like smooth curves when they're small) and instead display jagged rectilinear staircasing...you know, why don't you just look at the picture on page 450.

K
See *kilobyte.*

kerning
Closing up the space between certain letter pairs—like *AV* or *To*—to make them look better. Increasing the space between the letters is usually called *letterspacing.*

keyboard command
A combination of keystrokes (almost always involving ⌘ and often Shift, Option, Control and/or Caps Lock as well) that executes a command without your having to go up to a menu and choose it. Also called a *key combination* or *keyboard equivalent.* Compare *menu command.*

Key Caps
An Apple *desk accessory* that shows you what character you get for each keystroke in a font.

key-caps font
A font whose characters represent what the top of a key actually looks like—for example: ⌘ Option Shift A B C .

key combination
Another name for a *keyboard command.*

keypad
See *numeric keypad.*

KHz
An abbreviation for *kilohertz.*

kilobyte
A measure of computer memory, disk space and the like that's equal to 1024 characters, or about 170 words. Abbreviated *K.* Compare *megabyte* and *gigabyte.* Also see *mini-K.*

kilohertz
A thousand cycles, occurrences, alterations or pulses per second. Used to describe electromagnetic radiation like VLF and most sounds in the range of human hearing. Abbreviated *KHz.* Also see *hertz* and *megahertz.*

label
In System 7, one of seven descriptive names that you can attach to files or folders using the Label menu. List-view windows can be sorted by label (to group related files and folders together). On color systems, labels also assign a user-defined color to a file's icon.

Label menu
A menu in the Finder that lets you assign one of seven different *labels* to the selected item. You can change the labels that appear on the menu with the Labels control panel.

LAN *(pronounced as a word, not separate letters)*
An abbreviation for *local area network.*

landscape
Printing sideways on a page, so that the longer sides are at the top and bottom. Compare *portrait.*

laser printer
A computer printer that creates images by drawing them on a metal drum with a laser. The image is then made visible by electrostatically attracting dry ink powder to it, as in a photocopying machine.

LaserWriter
A line of laser printers made by Apple. Also see *ImageWriter* and *StyleWriter.*

launching
Opening (an application)—i.e. loading it into memory from disk.

LCD
Liquid crystal display—the display technology used on the screens of PowerBooks and the Mac Portable (as well as digital wristwatches and tiny-screen TVs). Compare *CRT.*

leader
A character that fills the space between the last character of text and the next tab stop. Tabs usually have no leaders—which means the space between the last character and the tab stop is blank. When tabs do have leaders, periods (dots) are most commonly used, but many programs let you choose any leader character you want.

leading *(LEHD-ing)*
The amount of space from the *baseline* of one line of type to the *baseline* of the next. Usually measured in *points.*

ligature
A character that's made up of two or more characters that touch. The most common ligatures are fi and fl (Shift Option 5 and Shift Option 6 in most fonts). Here they are plain: fi and fl. (I had to kern the letters apart so you could see the difference. This is a *very* subtle typographical detail—and, if you ask me, one that's on its way out.)

line spacing
See *leading.*

lines per inch
How the resolution of *halftones* is measured. Abbreviated *lpi.*

list box
A box with scroll bars that appears within a dialog box or other window and lists things—files, fonts or whatever.

local area network
A *network* of computers and related devices that's confined to a relatively small area, like one office or one building. Abbreviated *LAN.* More often simply called a *network.* Compare *wide area network.*

LocalTalk
Apple's cabling hardware for *AppleTalk* networks. Compare *PhoneNet.*

locking
Preventing a file or disk from being changed (until you unlock it). You can lock individual files or whole floppy disks in the Get Info window, and you can also lock a floppy disk by moving the plastic tab in the upper left corner of its back side, so that you can see through the little square hole. Locked disks are also called *write-protected.*

logging on
Connecting to a *bulletin board, online service, file server* or *shared item* (usually by entering a *user name* and password).

logic board
The main *board* in a computer (or other computer device); it holds the *CPU chip,* the *ROM* and the *RAM* (or some of it).

lpi
See *lines per inch.*

machine language
The actual instructions a computer obeys. Compare *high-level programming language.*

macro
A command that incorporates two or more other commands or actions. (The name comes from the idea that macro commands incorporate "micro" commands.)

macro program
Software that creates *macros* by recording your keystrokes and mouse clicks or by giving you a sort of pseudo programming language to write them in.

magnetic media
See *media.*

mail merge
The merging of database information like names and addresses into a letter template, in order to create personalized letters.

marquee
The rectangle of moving dots that surrounds a selection in some programs. So called for its resemblance to a movie marquee.

MB
An abbreviation for *megabyte.*

media
The generic name for floppy disks, hard disks (the disks themselves, not the devices that record on them), tapes and any other substances that store computer data, usually magnetically.

meg
An abbreviation for *megabyte.*

megabyte
A measure of computer memory, disk space and the like that's equal to 1024K (1,048,576 characters) or about 175,000 words. Abbreviated *MB* or *meg.* Some companies try to make a megabyte equal to an even million characters, to make their machines seem more powerful. I call this smaller "meg" a *minimeg.*

megahertz
A million cycles, occurrences, alterations or pulses per second. Used to describe the speed of computers' clock rates. Abbreviated *MHz.* Also see *hertz.*

memory
The retention of information electronically, on *chips.* Compare *storage.* (For more on the distinction, see the beginning of Chapter 3.) There are two main types of memory: *RAM,* which is used for the short-term retention of information (that is, until the power is turned off), and *ROM,* which is used to store programs that are seldom if ever changed.

menu
A list of *commands*. Compare *palette*. Also see *pop-down menu*, *pop-up menu*, *submenu* and *tear-off menu*.

menu bar
The horizontal area across the top of the screen that contains the *menu titles*.

menu box
A *menu title* or a command in a drop-shadowed box that you click on to display the rest of the menu.

menu command
A command you choose from a menu with the pointer, as opposed to a *keyboard command*. (They might both do the same thing—the difference is simply in how you invoke the command.)

menu title
Both the name by which a menu is called and the way you access it. Menu titles are arranged across the top of the screen in the *menu bar;* when you point to one and hold down the mouse button, the menu pops down.

message box
See *alert box*.

MFS
A single-level method of organizing files and folders on a Mac disk, in which folders can only be nested (contained) in other folders on the desktop, not in list boxes. The original Mac system, MFS has been superseded by *HFS*. The name is short for *Macintosh file system*.

MHz
An abbreviation for *megahertz*.

microprocessor
See *processor*.

mini-K
My name for "kilobytes" that are figured at an even one thousand characters instead of the standard 1024.

minimegs
My name for "megabytes" that are figured at an even one million characters instead of the standard 1,048,576 characters (1024K).

mnemonic *(nuh-MAHN-ik)*
Aiding memory. ⌘S is a mnemonic command, since the *S* stands for *Save*, but ⌘V (for *Paste*) isn't. Don't confuse *mnemonic* with *Naimonic (irritable, perfectionistic).*

modem *(MOE-dum)*
A device that lets computers talk to each other over phone lines (you also need a communications program). The name is short for *mo*dulator-*dem*odulator.

modem port
One of the two *serial ports* on the Mac's back panel, where you can attach *modems* and other *serial devices.*

modifier key
A key that modifies the effect of the *character key* being pressed. The standard *ADB keyboard* has five modifier keys: Shift, Option, ⌘, Caps Lock and Control.

modular Mac
A Mac (like the various Quadras and Mac IIs) whose monitors aren't built into the same box as the *CPU.* Compare *compact Mac* and *portable Mac.*

modules
Parts of a program that are separate yet interconnected.

monitor
The screen on which a computer displays things so you can read them. (Usually it's a *CRT* like those used in TVs, but sometimes it's an *LCD.)* Also called a *display,* or simply a *screen.*

monochrome
A *monitor* that displays variations of one color only. It can be either *black-and-white* or *gray-scale.*

monospaced
Said of fonts where all the characters occupy the same amount of horizontal space. Two such fonts on the Mac are Courier and Monaco. Compare *proportionally spaced.*

motherboard
See *logic board.*

(to) ***mount***
To make a disk icon available in the Finder.

mouse button
The button on top of the mouse (using the word *mouse* helps distinguish it from a *button* in a dialog box).

mouse cursor
A barbaric substitute for the perfectly adequate—and infinitely more elegant—term *pointer.* Its use can only be attributed to creeping PC-itis in the Macintosh world.

movie
The QuickTime file format, which lets you cut and paste sound, video or animation data as if it were text or graphics.

MS DOS
The original, and still the most popular, *operating system* used on IBM PCs and compatible computers. (The name stands for *Microsoft disk operating system.)* Virtually identical to *PC DOS.*

MUG *(pronounced as a word, not as separate letters)*
Frequently appended to the names of *user groups,* it stands for *Macintosh user group.*

MultiFinder
An Apple program that allows several applications, including the Finder, to be open at the same time under System 6. (System 7 doesn't need this separate program, since the capability is built in.)

multimedia
Presenting information via a variety of media, including sound, animation, video, text and graphics.

multitasking
Said of software or hardware that lets you do more than one thing at once.

multiuser
Said of software or hardware that supports use by more than one person at one time.

nanosecond
A billionth of a second. Used to measure the speed of memory chips, among other things. Abbreviated *NS.*

native format
The *format* an application normally saves files in.

nerd
Someone who's involved in computers to the exclusion of various social and sartorial skills. The archetypical nerd wears a plastic pocket protector full of pens and is profoundly uneasy conversing with people about anything other than computers. The term is generally used affectionately and many people apply it to themselves in mild and/or humorous self-deprecation. The adjective is *nerdy*.

Usage note: *Nerd* isn't synonymous with *hacker*. Although both terms connote passionate enthusiasm about, and involvement with, computers, *hacker* focuses on the technical sophistication and power that such involvement often produces, while *nerd* focuses on the social price at which such power and sophistication are often bought. Not all nerds are hackers, and not all hackers are nerds (although, of course, many are).

nesting
1. Putting folders inside folders (or anything inside anything).
2. Staying home and watching videotapes or working on your computer instead of venturing out into the dreaded "real world."

network
Two or more computers (and/or other computer-related devices) connected to share information. Usually the term refers to a *local area network*. Also see *AppleTalk*.

network administrator
The person responsible for setting up, maintaining and troubleshooting a network.

NFNT
The *new font numbering table*. Unlike the earlier font numbering system, which only provided 256 numbers, NFNT provides 16,000, thus greatly reducing the likelihood of font conflicts.

NLQ
Near-letter-quality. Said of printers.

node
Any one of the computers or other devices connected to a network.

Note Pad
An Apple *desk accessory* designed for jotting down and storing short notes.

NS
The abbreviation for *nanosecond*.

NuBus
A high-speed *bus* used by the *expansion slots* in the Quadras and the Mac II family.

numeric keypad
A grouping of number keys (and other, associated keys) arranged in a rectangle and separate from the regular keys. It can be part of or separate from the regular keyboard.

NumLock *(or* ***Num. Lock****)*
On keyboards with a *numeric keypad*, the setting in which the keypad inserts numbers into your document, rather than issuing commands. On most Mac keyboards, there's no key for switching between NumLock and command mode; it's handled by the software instead (although the NumLock light on Apple's extended keyboard doesn't always get triggered by the software).

object-oriented graphic
A picture or other graphic where each object, rather than being made up of separate dots (as in a *bit-mapped* graphic) is treated as a unit, as they are in *draw programs*.

So if you have a bit-mapped rectangle, you can erase a corner of it (say). But you also have to lasso (or somehow group) all the dots to select it as a unit (in order to move it, for example). An object-oriented rectangle can be selected simply by clicking on it, but you can't cut off a corner of it—it has to remain a square (or at least a four-sided polygon of some kind).

OCR *(pronounced as separate letters)*
Optical character recognition—the ability of software and/or hardware to read text from paper. Unlike a regular scanner that reads text (and everything else) as a series of dots, OCR scanners and software recognize the characters and thus generate editable text, as if someone had typed the characters in.

OEM *(pronounced as separate letters)*
The *original equipment manufacturer*—the actual producer of the basic equipment incorporated into a product and sold under another name. For example, Quantum is an OEM that makes many of the hard disks that come inside Macs.

OEM is also used as an adjective to describe products that are incorporated into products by other companies and marketed by them. So someone might say: *We're thinking of expanding out of the OEM market and selling some products under our own name.*

***offline** (or **off-line**)*
Said of things done while you're not actively connected to a computer or a network. For example, you might work on a message offline, then log onto an electronic mail system to send it. Opposite of *online*.

***online** (or **on-line**)*
On, or actively connected to, a computer or computer network. For example, online documentation appears on the screen rather than in a manual. Opposite of *offline*.

online service
A large commercial timesharing computer that gives users access to a wide variety of information and capabilities. AppleLink and America Online are examples.

opening
1. Expanding an *icon*, or a name in a list box, to a *window*—usually by double-clicking on it. With disk icons and folders, this happens on the *desktop*. With document icons, the application that created the icon is launched first, then the document is opened within it.
2. Launching a program (i.e. telling it to load into memory from disk).

operating system
The basic software that controls a computer's operation. On the Mac, it consists of the *System* file, *the ROMs*, the *Finder* (or a Finder substitute) and related software.

optical disk
A storage medium in which the data is read by, and written with, a laser.

Option
A *modifier key* used mostly for generating special characters.

option character
A character generated by pressing a character key while the Option key is held down.

orphan
A single line (usually the first line of a paragraph) sitting alone at the bottom of a page of text. Compare *widow*.

outline font
A font that's made up of an outline of the shape of each letter and that can be scaled to any size without degradation of quality. Sometimes called a *scalable font*. Also see *PostScript font* and compare *bit-mapped font*.

outline view
What you get when you click on the triangle next to a folder in the list-view windows of System 7's Finder: the folder's contents appear indented below it, in the same window.

overhead
The bytes in a file that aren't taken up by the actual text or other contents, but rather by things like the size, shape and location of the window in which the document appears on the screen, the fonts used, other formatting information, etc.

paged memory management unit
See *PMMU.*

paint
A standard graphics format for low-resolution (72-dpi) bit-mapped images (sometimes abbreviated in writing as *PNTG).* Compare *EPS, PICT* and *TIFF.*

paint program
A graphics program that generates *bit-mapped graphics* (collections of dots) rather than objects. Compare *draw program.*

palette
A collection of small symbols, usually enclosed by rectangles, that represent tools available in a graphics program. When you click on a box in the palette, the *pointer* changes to that tool. Compare *menu.*

Pantone colors
See *PMS.*

paragraph widow
See *widow.*

parameter RAM
A small portion of the Mac's RAM that's used to store control panel settings and other basic, ongoing information. It's powered by a battery so the settings aren't lost when the computer is turned off (but they are lost if you pull the battery). Also called *PRAM.*

PARC
See *Xerox PARC.*

parking
Locking the *read-write head* of a disk drive securely out of the way, so that neither it nor the media will be harmed if the drive is jarred while being moved.

password
A word or group of characters a user has to enter to log onto an online service or to gain access to password-protected files.

pasteboard
In page layout programs, a storage and work area outside the page, the contents of which don't print out.

pasting
Inserting something into a document from the Clipboard by choosing *Paste* from the Edit menu or hitting ⌘V. Also see *copying* and *cutting.*

patch
A relatively small piece of programming *code* added to an existing program to enhance performance or fix a *bug.*

pathname
A list of all the folders a file is in, from the outermost (the disk) to the innermost, and ending with the name of the file itself. Colons are placed between the elements, so pathnames look like this:

hard disk:personal stuff:letters:to family:Happy Birthday, Rita!

This pathname means that a file called *Happy Birthday, Rita!* is in a folder called *to family,* which is in a folder called *letters,* which is in a folder called *personal stuff,* which is on a hard disk called—rather unimaginatively—*hard disk.*

PC
1. Some people who are relatively new to computers (or unsophisticated about them) call *any* personal computer a *PC;* in their usage, even a *Mac* is a PC (what a thought!). But people who've been around for a while know that the term *PC* originated as a nickname for the IBM Personal Computer, which was introduced in 1981, and its various clones. They refer to other kinds of personal computers simply as—brace yourself—*computers,* or by their specific names *(Macs, Apple IIs,* etc.) That's the usage followed in this book.
2. An abbreviation for *printed circuit,* as in *PC board.*

PC DOS
Another name for *MS DOS.* (It's short for *[IBM] Personal Computer disk operating system.)*

PD
An abbreviation for *public-domain* or *public-domain software.*

PDS
See *Processor Direct Slot.*

peripheral
Any electronic device connected to a computer (e.g. a printer, hard disk, scanner, CD-ROM reader, etc.). Usually *peripheral* only refers to something that's either sold by a third party or that clearly isn't an integral part of the original system. For example, you wouldn't normally think of a keyboard sold with a machine as a peripheral, but you might consider a *third-party* keyboard a peripheral.

PhoneNet
Farallon Computing's cabling hardware for *AppleTalk* networks. Compare *LocalTalk.*

phosphor
The coating on the inside of *CRTs* (the cathode ray tubes used in many computer *monitors* and television sets). When a beam of electrons hits it, the phosphor glows, creating the image on the screen.

pica
A typesetting measure equal (for all practical purposes) to ⅙ of an inch—and exactly equal to 12 *points.*

PICS *(pronounced as a word, not separate letters)*
A standard format for animation files.

PICT *(pronounced as a word, not separate letters)*
A standard format for object-oriented graphics. (The name is an abbreviation of *pict*ure.) Compare *EPS, paint, PICS* and *TIFF.*

piracy
See *software piracy.*

pixel
One of the little dots of light that make up the picture on a computer (or TV) screen. (The name is short for *pic*ture *el*ement.) The more pixels there are in a given area—that is, the smaller and closer together they are—the higher the *resolution.* Often, pixels are simply called *dots.*

platter
In a *hard disk drive,* the rigid substrate (that is, the physical foundation) to which the information-bearing magnetic coating is applied.

PMMU

The *paged memory management unit* that makes *virtual memory* possible on the Mac (along with the appropriate software, of course). Called the 68851, it's part of the 68030 chip and can be added to the 68020.

PMS

1. The *Pantone Matching System*, an international standard coding system for colors that lets you specify and match them by number.
2. *Premenstrual stress.* I only put this in so I could tell you Roberta Cairney's line about it. She says the reason men are so crazy is that they're *always* premenstrual.

point

A typesetting measure equal (for all practical purposes) to 1/72 of an inch. The size of fonts and the amount of *leading* is typically measured in points. Compare *pica.*

pointer

What moves on the screen when you move the mouse. Its most common shapes are the *arrow* ( ), the *I-beam* ( ) and the *wristwatch* (I don't have a picture of that one; sorry).

pop down

What the Mac's regular menus actually do. Compare *pull down.*

pop-down menu

The Mac's standard kind of menu (usually—but inaccurately—called a *pull-down* menu). It pops down when you click on the menu title; to keep it extended, you hold down the mouse button. Dragging down the menu highlights each command in turn (except the dimmed ones). Compare *pop-up menu.* Also see *submenu* and *tear-off menu.*

pop-up menu

A Mac menu whose title doesn't appear in the menu bar and which, as its name implies, pops up (or out) rather than down. Pop-up menus appear when you click and hold the mouse button on a box that generates them (which is indicated by a drop shadow around the box). Compare *pop-down menu.* Also see *submenu* and *tear-off menu.*

port

Computerese for a *jack* where you plug in the cables that connect computers and other devices together. Most Macs have a *SCSI* port, two *serial* ports (marked for the printer and modem) and others.

portable Mac
A Mac (like the PowerBooks or the Portable) that includes the CPU, monitor and keyboard in a single, fold-up unit designed for portability. Compare *compact Mac* and *modular Mac.*

portrait
The normal way pages are printed, with the shorter sides at the top and bottom. Compare *landscape.*

PostScript
A *programming language* developed by Adobe that's specifically designed to handle text and graphics and their placement on a page. Used primarily in *laser printers* and *imagesetters.* Compare *QuickDraw.*

PostScript font
An *outline font* that works with PostScript (although PostScript does also make its own versions of *bit-mapped fonts* when you send them to a PostScript printer).

power supply
The part of a computer or computer *peripheral* that converts the 115-volt AC electricity from your wall socket to DC electricity of the voltage the device needs. The name is a little confusing, since power supplies don't *supply* power, but merely *modify* it.

power user
Someone who uses and understands advanced features of a computer. Compare *nerd* and *hacker.*

PRAM *(pronounced PEE-ram or, less accurately, as one word)*
See *parameter RAM.* Don't confuse this with *PROM.*

preferences
User-adjustable features of software. Many programs create separate files to keep track of preferences, and store them in the System Folder.

Preferences folder
A folder inside the *System Folder* that holds files that store the current settings for the Finder views and other user-adjustable features of the system software.

presentation program
A type of program that's basically a tool for producing electronic slide shows, usually to accompany spoken presentations.

print buffer
A hardware device that intercepts a print file on its way to the printer and reroutes it to the buffer's own memory, where it's held until the printer is ready for it. This allows you to continue working on other things while printing. Compare *print spooler.*

printed circuit board
A *board* on which the electrical connections between the *chips* are made by printed metallic ink. Also called a *PC board.* There's one in every Mac.

printer driver
A file that tells the Mac how to send information to a particular kind of printer.

printer font
An *outline font* designed to be used by printers (not on the screen). Printer fonts are normally represented on the screen by bit-mapped *screen fonts.* For example, PostScript printer fonts always come with screen fonts.

printer port
A *serial port* on the computer's *back panel* where you attach a printer or connect to *Apple Talk.*

print spooler
A piece of software that intercepts a print file on its way to the printer and reroutes it to the disk, where it's held until the printer is ready for it. This allows you to continue working on other things while the printing takes place. Compare *print buffer.*

processor
A *chip* that carries out the actual computing tasks in computers (and in smart *peripherals).* Macs often contain two processors—the *CPU chip* and a *coprocessor* for math calculations. Also called a *microprocessor.*

Processor Direct Slot (or PDS)
An *expansion slot* that connects to the *CPU* directly, rather than via a *bus* like *NuBus.*

program
A group of instructions that tells a computer what to do. Also called *software* and—by members of the Department of Redundancy Department—a *software program.*

programmer
Someone who writes *programs,* fixes *bugs* in them, adds new features to them, etc. As opposed to a *user,* who simply uses programs and to whom the programming is invisible (or should be).

programmer's switch
A small piece of plastic containing the *reset button* (which lets you restart your Mac in virtually any situation) and the *interrupt button* (which is used by programmers to *debug* software and by ordinary users to escape from some situations without having to take the more drastic step of restarting). On some Macs it comes installed; on others, you have to install it.

programming language
An artifical language for writing instructions that tell a computer what to do (as opposed to the natural languages, like English, with which people communicate with each other). A group of such instructions is called a *program.* Also see *high-level programming language* and *machine language.*

PROM *(pronounced as a word, not separate letters)*
A programmable *ROM;* one you can change with a special device.

prompt
On more primitive computers than the Mac, and in the Mac's built-in debugger (accessed by hitting the *interrupt button* on the programmer's switch), a symbol on the screen (often >) that indicates that the computer is waiting for you to tell it what to do.

proportionally spaced
Said of fonts whose characters occupy different amounts of horizontal space, depending on their size. Proportional spacing makes fonts much easier to read. Virtually all Macintosh fonts are proportionally spaced. Compare *monospaced.*

protocols
A set of standard procedures that control how information is transmitted between computers.

public-domain
Said of products you have the right to copy, use and give away without having to pay any money for the right. Things come into the public domain either because the copyright on them has expired or—as is the case with computer programs—because the copyright holder (usually the author) puts them there. Abbreviated *PD.*

Technically, you can do whatever you want with things that are in the public domain, including modify them and sell them, so many authors who don't charge for their software call their programs *freeware* and explicitly prohibit their alteration or sale. Many people aren't aware of this distinction and use the terms *public-domain software* and *freeware* interchangeably, but it's an important distinction nonetheless. Compare *shareware* and *commercial.*

publish** and **subscribe
Twin features supported by System 7 that let you link data in two files (or two places in one file) so that when you change it in one place, it automatically changes in the other.

pull down
What most people—including Apple—say the Mac's standard menus do. But it's not true—they *pop* down. For more on this earth-shattering distinction, see the rant on page 62.

QuickDraw
Bill Atkinson's brilliant programming routines that enable the Mac to display graphic elements on the screen with great speed and agility. QuickDraw is also used for outputting text and images to certain (non-PostScript) printers. Compare *PostScript*.

QuickTime
An *extension* that lets you cut and paste animations (or still pictures), with or without sounds.

quitting
Leaving an application and returning to the Finder (or a Finder equivalent).

radio buttons
A group of *buttons* only one of which can be on at a time (like the presets on a car radio). If you select one radio button, any other that's selected automatically deselects. Compare *checkboxes*.

***RAM** (pronounced as a word, not separate letters)*
The part of a computer's memory used for the short-term retention of information (in other words, until the power is turned off). Programs and documents are stored in RAM while you're using them. The name is short for *random-access memory*—although, actually, just about all kinds of memory are accessed randomly. Also see *memory, parameter RAM, contiguous RAM* and *ROM*.

***RAM cache** (cash)*
Another name for a *disk cache*.

RAM disk
A portion of memory that's set aside to act as a temporary disk, greatly speeding up work you do with programs and files stored on it. Unlike a *disk cache*, you—not the computer—decide what gets stored on a RAM disk.

rdev *(AHR-dev)*
The term used in System 6 for a utility program that displays an icon in the Chooser. *Printer drivers* are an example. *Rdev* is short for Chooser *dev*ice (the *c* was already taken—see *cdev).* Called *Chooser extensions* under System 7.

remote
Said of a computer (or network) to which you're connected by modem.

repeaters
Devices that boost the signals along cabling, commonly used in *networks* and *SCSI* chains.

Read Me document
A disk file that accompanies software and gives you information that's either very important or was left out of the printed manual.

read-only
Said of something you can look at and print but not change. Locked files or disks are read-only, and so are some optical disks, like *CD ROMs.*

read-only memory
See *ROM.*

read/write head
The part of a disk drive mechanism that actually deposits information on (writes) and extracts information from (reads) the disk.

reboot
To *boot* again (that was easy). Same as *restart.*

record
In a database program, a collection of related *fields.* For example, in a mailing list, a record might consist of the name, address, city, state, zip code and phone number of one particular person or company.

redraw *(or* ***refresh rate)***
How often the image on the screen is redrawn. (It looks solid, but actually it's being recreated many times a second.)

relational database
A database program that's capable of relating information in one file to that in another.

release version
The version of a program that's actually shipped to purchasers and stores. Theoretically, all the major bugs are out of it by that point. Compare *alpha version* and *beta version.*

RenderMan
A scene-description language analogous to *PostScript*, used for three-dimensional images.

reset button
One of the two buttons on the *programmer's switch.* It restarts the Mac. Compare *interrupt button.*

resident font
An outline font that's stored in a printer's ROM, so it's always available for printing.

resolution
The number of *dots* (or *pixels)* per square inch (or in any given area). The more there are, the higher the resolution.

resource
A font, sound, *Fkey* or keyboard layout that appears in a suitcase file or in the System file. Resources aren't considered files in and of themselves.

restart
To cause a computer to reload its *operating system* from disk, as if you just turned it on, but without actually turning off the power. When you restart, you lose all work that you haven't *saved.*

Restart
When capitalized, a command on the Finder's Special menu that (amazingly enough) *restarts* the Mac. Compare *Shut Down.*

Return
In text, the Return key causes the insertion point to move to the beginning of the next line. Elsewhere, it's often used to confirm an entry or a command.

RGB monitor
A color monitor that processes signals for red, green and blue separately.

RISC *(pronounced as a word, not separate letters)*
Reduced instruction set computing—a type of *processor chip* in which the number of commands has been reduced for faster operation.

***ROM** (rahm)*
The part of a computer's memory used to store programs that are seldom or never changed (on the Mac, they store parts of the system software). The name is short for *read-only memory*, because you can read information from it but can't write information to it the way you can with *RAM*. A *ROM* chip is often called simply *a ROM*. Also see *memory*.

***root directory** (or **root level**)*
The *disk window*—the window that contains all the folders and files on a disk. (So called because if you imagine the organization of folders and files on a disk as branches on a tree, this would be the root.)

router
A device that connects separate networks. It's smarter than a *bridge* but dumber than a *gateway*.

routine
A group of *programming* instructions that's intended to accomplish one particular task. A routine is less complex and less ambitious than a *program* (programs are mostly made up of routines).

RTF
Rich text format—a format for transferring files between applications while retaining text and formatting information. Compare *ASCII*.

sample
1. An audio snapshot of a sound wave, taken during digital recording.
2. A digitally recorded sound.

sampling
The process of recording sound digitally. The computer takes *samples* (audio snapshots) of a sound wave at regular intervals and translates them into numbers that can be stored on disk.

sans serif
Said of a font that has no *serifs* (*sans* being French for *without*). Optima is a sans serif font.

Save As...
A standard Mac command that lets you save a document under a different name and/or in a different location (and sometimes in a different format).

saving
Transferring information—usually a document—from memory to a disk.

scalable font
Another name for an *outline font.*

scanner
A device that converts images into digital form so that they can be stored and manipulated by computers.

scanning order
The order in which the *operating system* searches the *disk drives* for a *startup disk.*

Scrapbook
A *desk accessory* that stores material permanently (until you throw it away) and gives you easy access to it no matter what program you're in.

screen
Another name for a *monitor.*

screen blanker
Another name for a *screen saver.*

screen dump
Another name for a *screen shot.*

screen font
The *bit-mapped* version of a *printer font,* used to represent the font on the computer's screen.

screenful
The amount of text (or other data) displayed at any one time on the screen. Used when talking about scrolling—e.g. *clicking here scrolls you up one screenful.* Also called a *windowful* (as in: *it's a windowful, it's a marvelous, that you should care for me).*

screen saver
A program designed to prevent the *phosphor* on a computer screen from getting exhausted from too much use. Screen savers keep track of how long it's been since you hit a key or the mouse button and automatically black out the screen (or put a moving pattern on it) after a certain amount of time has passed. Hitting any key or the mouse button brings back the image that was on the screen before. Also called a *screen blanker.*

screen shot
A picture of what's currently on the screen (or on some portion of it), sent directly to a printer or saved to disk.

script
What a *program* or *routine* you write in HyperCard is called. Some other programs, like FileMaker and MicroPhone, also use the term.

scroll arrow
The arrow at either end of the *scroll bar.* Clicking on a scroll arrow moves the window's view up or down one line. Clicking on a scroll arrow and holding the mouse button down results in relatively smooth and continuous *scrolling.*

scroll bar
A rectangular bar that appears on the right and/or bottom edges of a window when there's more in it than what's displayed. Clicking in the gray area of the scroll bar moves the window's view up or down one screenful. Also see *scroll arrow* and *scroll box.*

scroll box
The white box in a *scroll bar* that indicates how what's displayed in a window relates to the total contents. So, for example, if the box is at the halfway point of the scroll bar, you're looking at the middle of the document. Dragging the scroll box allows you to scroll large distances.

scrolling
Moving through the contents of a *window* or a *list box* in order to see things not currently displayed (normally done with the *scroll bar, scroll arrow* and *scroll box).* In word processing programs and list boxes, scrolling is usually vertical, but in many other places, horizontal scrolling is equally likely.

SCSI
An industry-standard interface for hard disks and other devices that allows for very fast transfer of information. It's short for *small computer system interface* and is pronounced *scuzzy* by virtually everyone (officially, you're supposed to pronounce the individual letters, but I think I'd faint if I ever heard anyone do that). SCSI ports have been standard on all Macs since the Plus.

SCSI chain
A group of *SCSI devices* connected to each other and attached to a Mac's *SCSI port.*

SCSI ID
The number assigned to a *SCSI device* to distinguish it from other SCSI devices and so the Mac knows what order to access it in.

scuzzy
See *SCSI.*

search path
Where a computer looks for something (i.e. on what disks and in what folders).

sector
A 512-byte section of a *track.* The basic unit of storage space into which files are saved.

selecting
Telling the Mac what you want to be affected by the next command or action. If what you're selecting is in the form of discrete objects, you normally select them by clicking on them. If it's in the form of a continuum, you normally select part of it by dragging across it. To *deselect* something, you normally click anywhere else (although if you click on another object, you may select it in the process).

The two most important concepts for understanding the Mac are:

- Selecting—in and of itself—never alters anything.
- You always have to select something before you can do anything to it.

(the) ***selection***
Whatever is selected (and thus will be affected by the next command or action). The insertion point is also a kind of selection, because it indicates where the next event will take place (unless you move it).

selection rectangle
On the *desktop* and in many applications, a dotted box that appears when you click on an empty spot and drag. When you release the mouse button, the box disappears (or becomes a *marquee)* and everything that fell within it is selected. (In some programs, objects must fall entirely within the selection rectangle to be selected; in others, any object touched by the selection rectangle, however slightly, is selected.)

serial device
A modem, printer or other device that connects to the Mac through one of its *serial ports.*

serial port
Either of the jacks on the back of a Mac into which you can plug printers, modems, etc. *(Serial* refers to the fact that data is transmitted through these ports serially—one bit after another—rather than in *parallel*—several bits side by side.)

serif
A little hook, line or blob added to the basic form of a character to make a font more readable (or for decoration). *Serif* is also used as an adjective to describe a font that has serifs; the font you're reading (Bookman) is a serif font. Compare *sans serif.*

server
See *file server.*

service bureau
A business that takes material produced on your personal computer and prints it out on an *imagesetter* or *laser printer.* Most service bureaus also rent time on computers, send faxes, do photcopying,do data conversion, and the like.

shared item
In *file sharing,* a file or folder on one user's Mac that has been made accessible to others on the same network.

shareware
Software that's distributed on the honor system, usually through bulletin boards, user groups, information services, etc. You're allowed to try it out and give copies to others, and you only pay the (usually nominal) registration fee if you decide you want to continue using it. Compare *commercial* and *public-domain.*

Shift
Either of two *modifier* keys on the Mac's keyboard that are used to make letters uppercase and for many other purposes (for example, see *shift-clicking).*

shift-clicking
Holding down the Shift key while clicking the mouse button. Shift-clicking allows you to select multiple objects or large amounts of text, depending on the application.

Shut Down
A command on the Finder's Special menu that prepares the Mac to be turned off (or actually turns it off, depending on which model Mac you have). Compare *Restart.*

***SIG** (pronounced as a word, not separate letters)*
A *special interest group* that's part of a larger organization like a *user group.*

SIMM *(pronounced as a word, not separate letters)*
A *single in-line memory module*—a package for memory chips used in many models of the Mac.

single-sided disk
An obsolete kind of Macintosh floppy disk that only stores data on one side and holds 400K of information. Compare *double-sided disks.*

68000 *(sixty-eight thousand)*
A *CPU chip* used in the original 128K Mac, the 512K Mac, the Mac Plus, the SE, the Portable, the original Classic, the PowerBook 100, the original LaserWriter, the LaserWriter Plus, II SC and II NT and the Personal LaserWriters SC and NT.

68020 *(sixty-eight oh twenty, or sometimes simply oh twenty)*
A faster and more powerful *CPU chip* than the *68000*, used in the Mac II, the original LC, the LaserWriter II NTX and in many accelerator boards.

68030 *(sixty-eight oh thirty, or sometimes simply oh thirty)*
A faster and more powerful *CPU chip* than the *68020*, which is used in the Mac IIx, cx, ci, si, fx, the SE/30, the Classic II, the LC II, the PowerBooks 140, 145 and 170, and the LaserWriters IIf and g.

68040 *(sixty-eight oh forty, or sometimes simply oh forty)*
A faster and more powerful *CPU chip* than the *68030*, it incorporates the functions of the *68881* and *68882* chips described below. Used in the Quadras.

68851 *(sixty-eight eight fifty-one)*
See *PMMU.*

68881 *(sixty-eight eight eighty-one)*
The math *coprocessor* chip used in the Mac II.

68882 *(sixty-eight eight eighty-two)*
The math *coprocessor* chip used in the Mac IIx, cx, si, ci, fx, the SE/30 and the PowerBook 170.

size box
An icon consisting of two overlapping boxes, found in the bottom right corner of most *windows*, that allows you to change the window's size and shape. Compare *close box* and *zoom box.*

slot
See *expansion slot.*

software
The instructions that tell a computer what to do. Also called *programs* or, redundantly, *software programs*. Compare *hardware*.

Usage note: *Software* is a *stuff* word (like *butter* or *money*), not a *things* word (like *stick* or *coin*). It's no more correct to say *a software* than it is say *a stuff*.

software piracy
Copying commercial software without permission and without paying for it.

sound input port
The jack on the back panel of some Macs (including the Classic II, LC and LC II, si, Quadras and PowerBooks 140, 145 and 170) for attaching an external microphone.

sound output port
The jack on the Mac's back panel for attaching headphones or speakers.

source
What you call the file, folder or disk from which a file gets copied, moved, installed or received over a modem. Compare *destination*.

special interest group
See *SIG*.

spooler
See *print spooler*.

spread
Two facing pages. (Technically, this is a *two-page spread*, and *three-page spreads* and more are possible. But these don't come into play much on the Mac.)

stack
A file created by HyperCard.

staircasing
See *jaggies*.

star
A type of network *configuration* in which peripheral nodes are connected to a central box like spokes on a wheel. Compare *backbone* and *daisy chain*.

startup disk
The disk that contains the *System file* and the *Finder* the Mac is currently using. You can change it, so it doesn't necessarily have to be the disk you actually started up the Mac with.

Startup Items folder
A folder inside the System Folder that holds programs or documents that will be opened automatically when the Macintosh starts up.

stationery
A feature of many programs that lets you create various default documents, with different margins, fonts, included text, etc. Unlike a regular document, which opens with the name you've given it, stationery opens as an untitled document (or makes you choose a name for the new document before it will open). In other words, stationery is a kind of *template.*

In System 7, you can make most documents into stationery (regardless of what application created them) by clicking the *Stationery* box in their Get Info windows.

storage
The long-term retention of information magnetically (on *disks* or tapes) or optically (on *optical disks* or *CD ROMs).* It persists after you turn your computer off. Compare *memory.* (For more on the distinction, see the first entry in Chapter 3.)

string
Any specified sequence of characters—a word, a phrase, a number, whatever. The term is usually used in the context of searching and replacing; for example: *type in the string you want to find, hit the tab key, then type in the string you want to replace it with.*

strobe
Another name for *flicker.*

style
A variation on a font—like bold, italic, outline or shadow. In this sense, it's also called a *type style.* Compare *Style.*

Style
In Word and other programs, a Style is a grouping of formats. In this book, we capitalize this meaning of the word, to avoid confusion (as much as possible) with *style* (see the previous definition).

StyleWriter
An inkjet printer made by Apple. See also *LaserWriter* and *ImageWriter.*

submenu
A menu whose title is an item on another menu, and which appears to the right of that menu when you choose its title (or to the left, if there's not enough room on the right).

subscribe
See *publish and subscribe.*

suitcase file *(or simply* ***suitcase****)*
A file that stores *fonts*, sounds or *desk accessories*, and is identified in the Finder by its suitcase-shaped icon. In System 7, suitcases operate like folders, and their contents are like files; in System 6, you move fonts, sounds and desk accessories into and out of a suitcase file with Font/DA Mover. You can open (activate) suitcase files (so their contents will appear on menus) with font/DA management programs like Suitcase or MasterJuggler.

support
1. Help with computer problems (either hardware or software), usually in the form of verbal advice. Support can be provided either by the vendor that sells you the product or by its manufacturer or publisher.
2. To say that a piece of hardware or software *supports* something means that it works with it, or enables it to work. For example, System 7 supports TrueType fonts, while System 6 doesn't (usually).

surge protector *(or* ***surge suppressor****)*
A device that protects computer equipment from sudden variations in electrical current. Every Mac should be plugged into one.

SYLK
Microsoft's *sy*mbolic *l*in*k* format for data transfer (especially between spreadsheets and databases).

sysop *(SISS-ahp)*
The person who runs a bulletin board (short for *system operator).*

system bomb
See *bomb.*

system crash
See *crash.*

system disk
Any disk containing the *system software* the Mac needs to begin operation (i.e. the System file and either the Finder or a Finder substitute). If it contains the system software you're using to run your Mac at the moment, it's the *startup disk.*

system extension
See *extension.*

System file *(or simply* ***the System****)*
The basic program the Mac uses to start itself and to provide certain basic information to all applications. The System file can't be launched like a regular application; instead, it launches itself when you start up the Mac and insert a disk that contains it. Together with the Finder, the System file comprises what—on other computers—is called the *operating system.*

System Folder
A standard folder on Mac disks that contains the *System file,* the *Finder* and other *system software.*

system hang
See *hang.*

system heap
The area of memory set aside for storing system information about extensions, control panels, etc.

System 7
The more recent of the two versions of the Mac's *system software* still in widespread use—it's been included with every Mac shipped since the summer of 1991.

System 6
One of the two versions of the Mac's *system software* that's still in widespread use—although it's being replaced by the newer version, System 7.

system software
A catchall term for the basic programs that help computers work; it includes *operating systems, programming languages,* certain *utilities* and so on. Some examples of system software on the Mac are the *Finder,* the *System,* the *Chooser,* the *control panels* and *printer drivers.*

Tab

In text, the Tab key moves the insertion point to the next tab stop. In databases, spreadsheets, dialog boxes and the like, it often moves the insertion point to the next area where information can be inserted (in other words, to the next field, cell, text box, or whatever).

tab-delimited

Said of database programs and files that follow the Mac standard of using Tab to separate *fields*.

TeachText

A standard Apple program that can open text and *PICT* graphics files, as well as create its own text files. It's often used to create *Read Me* documents.

tear-off menu

A menu you can remove from the *menu bar* and move around the screen like a window. It stays fully extended when detached, so you don't have to pop it down every time you want to use it. Tear-off menus always remain in front of open document windows. Compare *pop-down menu*, *pop-up menu* and *submenu*.

telecommunicating

Transferring information between computers over telephone lines.

template *(TEM-plit, not -plate)*

A document with a special format that you use repeatedly. You modify it to the present use and save it with a different name. One common type of Mac template is called *stationery*.

terminator

A small piece of hardware that keeps signals from echoing back and forth along *SCSI* or *PhoneNet* cables.

text box *(or* ***text field****)*

An area, usually in a *dialog box*, where you insert text.

text file

An *ASCII* file—just characters, no formatting.

text-only

A term sometimes used to describe *text files*.

(the) ***text tool***

Another name for the *I-beam pointer*.

thermal fusion
A printing technology in which tiny heated elements push a ribbon against a page, bonding a waxy ink to the paper.

third-party
Said of hardware or software that doesn't come from the maker of what you're using it with, and that you didn't develop yourself. A couple of examples are a non-Apple hard disk you attach to your Mac, or a spelling checker not published by the publisher of the word processing program you're using it with.

32-bit addressing
A feature of System 7 that enables the Mac to use more than eight megabytes of RAM.

TIFF *(pronounced as a word, not separate letters)*
A standard graphics format for high-resolution (greater than 72-dpi) bit-mapped images, like those generated by most scanners. The name is an abbreviation of *tagged image file format.* Compare *EPS, paint, PICT* and *PICS.*

title bar
The horizontal strip at the top of a *window* that contains its name. When the window is active, it's filled with six horizontal stripes and has a *close box.* To move a window, you drag it by the title bar.

toggle
Something which turns off and on each successive time you access it. For example, the common type styles (bold, italic, etc.) are toggles, because the first time you choose them from the menu (or with a command), they turn on, and the next time they turn off. Other kinds of toggles are *checkboxes* and menu commands that switch names (e.g. *Show Ruler, Hide Ruler).*

tracking *(or* ***track kerning****)*
Changing the letter spacing in a selected piece of text, in order to pull a word up from the line below, or to tighten a line that's too *loose*— that is, one on which the words and letters are too far apart. You can also use tracking to loosen up a line that's too *tight*— that is, one on which the words and letters are squeezed too closely together (as they are here).

tracks
Concentric circles running around a disk, which are divided into *sectors* and are used for storing data.

transparent
Said of programs that work so smoothly and intuitively that you forget they're there. *Transparency* lets you concentrate on your work, rather than having to hassle with the software.

Trash
An icon into which you put files to be deleted (which happens when you choose *Empty Trash* from the Finder's Special menu). You can also eject a floppy disk by dragging its icon to the Trash. The Trash appears on the bottom right of the Mac desktop (unless you move it).

Trojan Horse program
A program that conceals and transports a *virus*.

TrueType
An *outline font* developed by Apple and supported by System 7. Unlike *PostScript fonts*, a single TrueType font file works for both the screen and any printer.

Tune-Ups
Utilities from Apple that come out periodically to fix bugs in—and/or enhance features of—the Mac's *system software*.

Turing test
A method devised by the brilliant British mathematician and logician Alan M. Turing (1912–54) to decide, without prejudice, whether what a computer does can be called thinking. You type questions and statements into a computer that's connected to a computer in another room, and try to determine, by means of the remote computer's replies, whether it's being handled by another person or by a program.

If you think you're talking to a human when you're actually talking to a program, then (Turing's argument goes) the remote computer must be considered capable of thinking, since what it's doing is indistinguishable from what we call thinking when people do it. All computers so far would fail the Turing test (as would most newscasters)—except in certain areas like playing chess, where computers (but not newscasters) are among the best in the world.

24-bit color
Said of images where each *pixel* has 24 *bits* of memory assigned to it. 24-bit color can produce a palette of 16.7 million colors (or shades of gray). Compare *eight-bit color*.

Type 1 font
A *PostScript* font format, developed by Adobe Systems, that incorporates *hinting*. Compare *Type 3 font*.

Type 3 font
A *PostScript* font format that's well-suited for complex, graphic-oriented fonts (characters that contain shades of gray, for example). Compare *Type 1 font*.

Undo
A standard Mac command (⌘Z) that undoes the last text that was typed or the last editing or formatting command that was given. Many commands can't be undone, and the ones that can vary with the application.

In any well-written Mac program, *Undo* is a *toggle*, so you can flip back and forth between two versions of something until you decide which you prefer. Ideally, there are several levels of undo, so you can go back past the last thing you did.

Unix
An *operating system* developed by Bell Labs for minicomputers but now also used on microcomputers like the Mac. Apple's implementation of Unix for the Mac is called *A/UX*.

uploading
Sending a file to a computer that's distant from your own. Opposite of *downloading*.

user
Someone who simply uses programs, as opposed to a *programmer*, who writes them. It's like the difference between an automobile mechanic and a driver. Just as you don't need to know how a carburetor works to be an expert driver, you don't need to know anything about programming to be an expert Macintosh user.

user (or users) group
A club made up of people who are interested in computers in general, a particular kind of computer, a particular kind of software, or even an individual program. They're typically nonprofit and independent of any computer manufacturer or publisher. Also see *SIG*.

user interface
The way a computer (or a computer program) communicates with people; what it's like to use.

utilities
Programs that perform tasks that are either relatively simple (like searching for specific files on disk) and/or that are support tasks for *applications* (like checking the spelling in a document).

vaporware
Software that was announced a while ago but still hasn't shipped.

version
A number or name that indicates the...well...*version* of a piece of software. If the first number changes, it's a *major version* (for example, System 6 to System 7). If the third number changes, it's a *minor version* (for example, System 7.0 to System 7.0.1). If the second number changes, it falls somewhere in between (for example, System 7.0 to System 7.1).

video card
A *card* you plug into your Mac to control an external monitor.

Views
A *control panel* file that lets you change the way files and folders are shown in *Finder* windows.

virtual memory
A technique that lets a computer treat part of a hard disk as if it were *RAM*.

virus
A program that functions on your computer without your consent. A benign virus may do nothing more than duplicate itself, but some are meant to destroy data.

VLF
Very low frequency radiation (between 10KHz and 30KHz) which is generated by computer *monitors* (as well as other devices that generate electric and magnetic fields). Compare *ELF*.

volume
A general term for a storage device—usually a *hard disk*, *floppy* or *CD-ROM*.

VRAM
Video *RAM* that's dedicated to handing the image displayed on a monitor. VRAM is built into some Macs (like the LCs and the Quadras), and it also comes on *video cards*.

WAN
An abbreviation for *wide area network.*

wide area network
A *network* that joins computers or other networks at widely separated locations. Abbreviated *WAN.* Compare *local area network.*

widow
A single line (usually the last line of a paragraph) sitting alone at the top of a page of text. Compare *orphan.*

Widow is sometimes also used to refer to a single word (or a few short words) forming the last line of a paragraph. In this sense, it's usually called a *paragraph widow.*

wildcard
A symbol that means *any character* or *any sequence of characters* (just as a wild card in poker can stand for any card). Wildcards are useful in searches when you know some but not all of the characters (or characteristics) you're looking for.

window
An enclosed area on the Mac's screen that has a *title bar* (which you can use to drag the window around). Disks and folders open into windows, and documents appear in windows when you're working on them. Compare *box.*

windowful
The amount of text (or other data) displayed at any one time in a window. Used when talking about *scrolling* (e.g. *clicking here scrolls you up one windowful).* Also called a *screenful.*

WYSIWYG *(WIZ-ee-wig)*
What you see is what you get—which means that the image on the computer screen is what will print on paper.

word wrap
The feature, found in virtually all computer programs that generate text, that automatically moves you down to the next line when the line you're on is full, without your having to type Return.

worksheet
A common name for a spreadsheet document or *template.*

WORM
Write once, read many—a type of optical storage medium that you can save data onto; you can't, however, erase data from it or write over what's already saved (so the medium isn't reuseable).

wristwatch
The form the pointer normally takes (and *should* take) when you have to wait for the Mac to do something. (Unfortunately, some poorly written programs don't always implement this feature, or do so less often than they need to.)

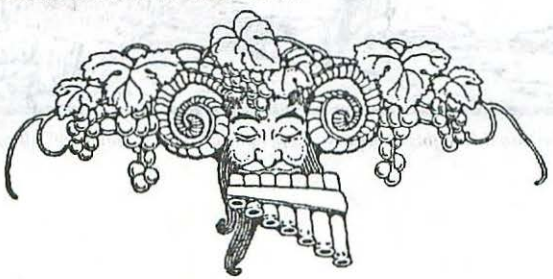
writing
Transferring information from the computer's memory to a storage device, like a hard disk.

Xerox PARC *(ZEER-ahks PARK)*
Xerox Corporation's Palo Alto Research Center, where most of the early work was done on what became the Mac's *user interface*. Often called simply *PARC*.

x-height
The height of lowercase letters in a font (not counting *ascenders* and *descenders)*. In a font with a high x-height, lowercase letters like *x* are closer to the height of the caps than they are in a font with a low x-height. Helvetica, Bookman and Benguiat have relatively high x-heights; Times and Zapf Chancery have relatively low x-heights.

zone
A subdivision of a *network*.

zoom box
A small box on the right side of the title bar of most windows. Clicking on the zoom box expands the window to fill the screen; clicking again returns it to its original size and shape. (In many Microsoft products, you can do the same thing by simply *double-clicking* on the title bar.) Compare *close box* and *size box*.



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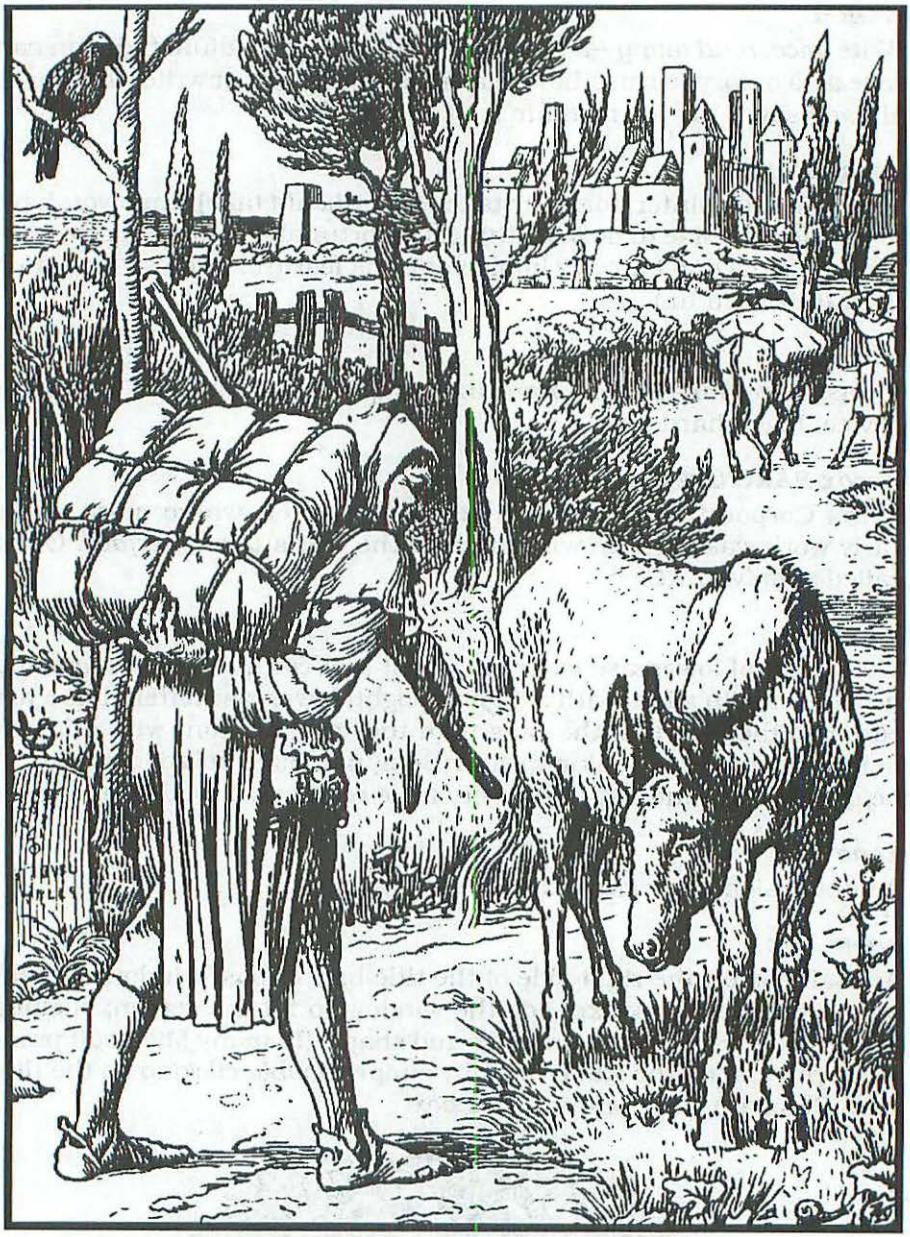

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Appendix B

List of companies and products

There are two kinds of entries in this appendix: company listings, which give you addresses, phone numbers and products; and product listings, which refer you to the company listings. When names of products and companies are so similar that the two listings would be right next to each other (e.g. FoxBASE *and* Fox Software*), we drop the product listing. Entries are alphabetized as if spaces and hyphens didn't exist.*

We spent a fortune in phone calls and time compiling the information in this appendix, but we weren't able to succeed 100%. When our information is partial, we give you what we have. Please don't call us to ask us for addresses or phone numbers not listed here; if they're not here, we don't have them. See Chapter 20 for some magazines where you might be able to find them.—AN

***Aask** (in MockPackage Plus) / CE Software*

Abacus Concepts
1984 Bonita Av, Berkeley CA 94704; 800 666 7828, 510 540 1949, fax: 510 540 0260
StatView

Abaton Technology
48431 Milmont Dr, Fremont CA 94538; 800 356 4283, 510 498 1111, fax: 510 657 0601
InterFax 24/96

Abbott Systems
62 Mountain Rd, Pleasantville NY 10570; 800 552 9157, 914 747 4171, fax: 914 747 9115
Calc+; CanOpener

A.B. Dick Record Systems
5700 W Touhy, Chicago IL 60648; 800 327 8798, 312 763 4455, fax: 312 647 4455
printer stencils

Abvent SA (see also Asym)
3 rue Decrès, 75014 Paris France; 011 33 14 395 0505
Zoom

***AccelaWriter** / Xante*

***Accelerator** / Macromedia*

***AccessPC** / Insignia*

***Accountant Inc.** / Softsync*

***Accounting series for Macintosh** / Peachtree*

Acius
10351 Bubb Rd, Cupertino CA 95014; 408 252 4444, fax: 408 252 0831
File Force; 4th Dimension

Acoustic Research
330 Turnpike St, Canton MA 02021; 800 225 9847, 617 821 2300, fax: 617 784 4102
Powered Partners

***Acta** / Symmetry*

***The Active Window** / Boston Computer Society*

Activision
11440 San Vicente Blvd, Suite 300, Los Angeles CA 90049; 310 207 4500, fax: 310 820 6131
Sargon

Addison-Wesley
Route 128 Jacob Way, Reading MA 01867; orders: 800 447 2226, 617 944 3700; fax: 617 944 9338
Macintosh books

***Address Book** / Leitch, Jim*

***Address Book Plus** / Power Up*

***AddressWriter** / CoStar*

Adobe Systems
1585 Charleston Rd, Box 7900, Mountain View CA 94039; 800 833 6687 (sales only); 415 961 4400, fax: 415 961 3769
ATM; Illustrator; Photoshop; PostScript; PostScript fonts; Premiere; Streamline; Type Reunion

Advanced Gravis Computer Technology
7400 MacPherson Ave #111, Burnaby BC Canada V5J 5B6; 604 431 5020, 604 431 5155
MouseStick

Advanced Software
1095 E Duane Av, Suite 103, Sunnyvale CA 94086; 800 346 5392, 408 733 0745, fax: 408 733 2335
InTouch

***Adventures in Musicland** / Dr T's Music*

AEG/Olympia
8818 John Carpenter Fwy, Dallas TX 75247; 800 832 4727, 214 630 4608, fax: 214 638 2012
NP60APL (dot-matrix printer)

***AEHD Plus Drive** / Applied Engineering*

Affinity Microsystems
1050 Walnut St, Suite 425, Boulder CO 80302; 800 367 6771, 303 442 4840, fax: 303 442 4999
Tempo

After Dark / Berkeley Systems

After Hours Software
Tri Center Plaza, 5990 Sepulveda Blvd, Suite 240, Van Nuys CA 91411; 818 780 2220, fax: 818 780 2666
Gum-P

Agfa
90 Industrial Way, Wilmington MA 01887; 800 424 8973, 508 658 5600, 508 657 8568
Art & Technology of Typography; outline fonts

AG Group
2540 Camino Diablo, Suite 202, Walnut Creek CA 94596; 510 937 7900, fax: 510 937 2479
EtherPeek; LocalPeek

Aitken, Kevin
1670 El Camino Real #162, Menlo Park CA 94025
System Picker

Aker, Sharon Zardetto *(writer & consultant)*
20 Courtland Dr, Sussex NJ 07461; AppleLink d4957, CompuServe 72511, 233

Aladdin Systems
165 Westridge Dr, Watsonville CA 95076; 408 761 6200, fax: 408 761 6206
StuffIt Deluxe and Lite

Aldus *(also see the next entry)*
411 First Av S, Seattle WA 98104; 800 685 3540, 206 628 5739, fax: 206 343 3360
Aldus Additions; Digital Darkroom; FreeHand; PageMaker; Persuasion; SuperCard; SuperPaint; Super 3D

Aldus Consumer Division *(formerly Silicon Beach)*
9770 Carrol Center Rd #J, San Diego CA 92126; 619 695 6956, fax: 619 695 7902
Apache Strike; Dark Castle; Gallery Effects

Alias Research
Style Division, 110 Richmond St E, Toronto ON Canada M5C 1P1; 800 447 2542, 416 362 9181, fax: 416 362 4696
Alias Sketch!; Upfront

Alsoft
22557 Aldine Westfield #122, Spring TX 77373; 800 257 6381, 713 353 4090, fax: 713 353 9868
DiskExpress II; MasterJuggler

Altra
520 W Cedar St, Rawlins WY 82301; 800 726 6153, 307 328 1342, fax: 307 328 1346
Felix

Altsys
269 Renner Rd, Richardson TX 75080; 214 680 2060, fax: 214 680 0537
Fontastic; Fontographer; Metamorphosis

Alverson, David P.
5635 Cross Creek Ct, Mason OH 45040
Z Term

Alysis
1231 31st Av, San Francisco CA 94122; 800 825 9747, 415 566 2263, fax: 415 566 9692
More Disk Space; SuperDisk!

AmandaStories / Voyager

Amaze
11810 115th Av NE, Kirkland WA 98034; 206 820 7007, fax: 206 823 0568
Far Side Computer Calendar

American Computer Exchange
6065 Roswell Rd, Suite 535, Atlanta GA 30328; 800 786 0717, 404 250 0054, fax: 404 250 1848
guide to used computer equip

America Online
8619 Westwood Center Dr, Vienna VA 22182; 800 227 6364, 703 448 8700, fax: 703 448 0760

Amiga—see Commodore

André, Airy
GNU Chess

Animation Works / Gold Disk

Annabel's Dream of Ancient Egypt / Texas Caviar

Apache Strike / Aldus Consumer Division

APDA *(Apple Programmers & Developers Association)*
800 282 2732, 800 637 0029 (in Canada)
MPW C (compiler)

Aperture Networker & Pro / Graphic Mgmt

Apple Computer
20525 Mariani Av, Cupertino CA 95014; 800 776 2333, 408 996 1010, fax: 408 974 6726
AppleCare; Apple File Exchange; AppleLink; AppleShare; AppleTalk Remote Access; Apple IIe emulation card; CD ROM drive; Compatibility Checker; DiskCopy; disk drives; Ethernet card; fonts (TrueType, bit-mapped); ImageWriter; Inter•Poll; LaserWriters; LaserWriter Utility; LocalTalk connectors; Macintosh computers and system software; Macintosh PC Exchange; Mode32; monitors; QuickTime; scanner; StyleWriter; TeachText

AppleWorks / Claris

Applied Engineering
3210 Beltline Rd, Suite 154, Dallas TX 75234; 800 554 MACS, 214 241 6060, fax: 214 484 1365
AEHD Plus Drive; other hard drives

Appoint
7026 Koll Center Pkwy, Suite 230, Pleasanton CA 94566; 800 448 1184, 510 417 0611, fax: 510 417 0614
MousePen Pro; Thumbelina

***APS** (Alliance Peripheral Systems)*
2900 S 291 Hwy, Independence MO 64057; 800 233 7550, 816 478 8300, fax: 816 478 4596
disk drives; hardware

Arborworks
431 Virginia Av, Ann Arbor MI 48103; 800 282 2732, 313 747 7087, fax: 313 747 8775
SCSI Tool

ArchiCAD / Graphisoft

Architrion / UNIC

Ares Software
561 Pilgrim Dr, Suite D, Foster City CA 94404; 800 783 2737, 415 578 9090, fax: 415 378 8999
FontMonger

Articulate Systems
600 W Cummings Park, Suite 4500, Woburn MA 01801; 800 443 7077, 617 935 5656, fax: 617 935 0490
Voice Impact (regular and Pro)

ArtRoom / Image Club

ArtRoundup / Dubl-Click

Asanté Technologies
404 Tasman Dr, Sunnyvale CA 94089; 800 662 9686, 408 752 8388, fax: 408 734 4864
Ethernet cards

Aspects / Group Technologies

Asym Technologies
924 Carl Rd, Lafayette CA 94549; 510 943 6157, fax: 510 943 3213
Zoom

Atlantic Technology
343 Vanderbilt Av, Norwood MA 02062; 617 762 6300, fax: 617 762 6868
Pattern 100

Attain
48 Grove St, Summerville MA 02144; 617 776 2711, fax: 617 776 1626
In Control

AT&T Graphic Software Labs
3520 Commerce Crossing, Suite 300, Indianapolis IN 46240; 317 844 4364, fax: 317 575 0649
MacTopas

Audiomedia / Digidesign

AutoCAD / Autodesk

Autodesk
2320 Marinship Way, Sausalito CA 94965; 415 332 2344, fax: 707 794 1325 (customer service)
AutoCAD; Generic CADD

***Auto•des•sys** (Automated Design Systems)*
2011 Riverside Dr, Columbus OH 43221; 614 488 8838, fax: 614 488 0848
Form•Z

AutoDoubler / Salient

Avery Dennison
777 E Foothill Blvd, Azusa CA 91702; 800 423 6518, 818 969 3311, fax: 818 969 9693
labels; MacLabel Pro

Backlight Control / Batista, Ricardo

BAD / Garnevale, Giuseppe

Band in a Box Professional / PG Music

Baseline Publishing
1770 Moriah Woods Blvd, Suite 14, Memphis TN 38117; 800 926 9677, 901 682 9676, fax: 901 682 9691
Exposure Pro; InitInfo Pro; PowerBoost Utilities; Thunder 7

Basura / Monroe, Fred

Batista, Ricardo
c/o Apple Computer
Extensions Manager; Zync

Battle Chess / Interplay

***Beatty Collection** (fonts)* / Font Shop

Berfield, Scott
26043 Gushue St, Hayward CA 94544; 510 581 6194
Speedometer

Berkeley Systems
2095 Rose, Berkeley CA 94709; 510 540 5535, fax: 510 540 5115
After Dark; More After Dark; Stepping Out

Bernoulli drives / Iomega

Best Power Technology
Route 1 Hwy 80 S / Box 280, Necedah WI 54646; 800 356 5794, 608 565 7200, fax: 608 565 2221
surge suppressors

BetterWriters / GDT Softworks

Beyond / Dr T's Music

Beyond Dark Castle / Aldus Consumer Div.

BigCaps / Dubl-Click

***Big Fish** (book design)*
1736 Stockton #4, San Francisco CA 94133; 415 986 5030

Bitstream
215 First St, Cambridge MA 02142; 800 522 3668, 617 497 6222, fax: 617 868 0784
PostScript fonts

BJC 820 / Canon

Blackout / Welch, Andrew

Blaschek, Günther
Petzoldstr. 31, A—4020 Linz Austria
PopChar

Blehm, Duane *(in memory of)*
HomeTown Software, 100 S Durham, Ulysses KS 67880
Cairo Shootout; Stunt Copter

The Blind Watchmaker / Norton, W.W

Blocker / Kodani, Hiroyuki

Blyth Software
1065 E Hillsdale Blvd, Suite 300, Foster City CA 94404; 800 34 OMNIS, 415 571 0222, fax: 415 571 0222
Omnis 7

BMUG
1442 A Walnut St #62, Berkeley CA 94709; 510 549 2684, fax: 510 849 9026
BMUG Guide to Bulletin Boards and Beyond; freeware and shareware

BoCoEx Index / Boston Computer Exchange

Bond, Bill
12950 Walnut Way Terr, St. Louis MO 63146; 314 542 0204
FreeTerm

BootMan / Steinberg, Bill

Borland International
1800 Green Hills Rd, Scotts Valley CA 95066; 800 331 0877, 408 438 8400, fax: 408 439 8088
dBASE IV (PC database); Full Impact; Full Paint; FullWrite

Boston Computer Exchange
Box 1177, Boston MA 02103; 800 262 6399, 617 542 4414, fax: 617 542 8849
BoCoEx Index

Boston Computer Society
48 Grove St Davis Square, Somerville MA 02144; 617 625 7080
The Active Window; Macintosh SIGs

The Bove & Rhodes Inside Report
Box 1289, Gualala CA 95445; 707 884 4413

Brainstorm Products
1145 Terra Bella Av, Mountain View CA 94043; 415 964 2131, fax: 415 964 2135
Brainstorm Accelerator

Bravo Technologies
Box 10078, Berkeley CA 94709; 510 841 8552, fax: 510 841 8559
MacCalc

Brier Technology
2148 Bering Dr, San Jose CA 95131; 408 435 8463, fax: 408 435 7921
very-high-density floppy drives

Broadcast / Lindenberg, Joachim

Brøderbund Software
Box 6121, 500 Redwood Blvd, Novato CA 94948 6125; 800 521 6263, 415 382 4400, fax 415 382 4419
Kid Pix (& Companion); The Playroom; TypeStyler; Carmen Sandiego series

Brother International
200 Cottontail Ln, Somerset NJ 08875 6714; 908 356 8880
HJ 100i (printer)

Brown, Byron *(page layout)*
1516 Beverly Pl, Albany CA 94706; 510 527 6374

Bryan, Steve
Sexton Building, Suite 625, 529 S 7th St, Minneapolis MN 55415
init managers

BubbleJet BJ10ex / Canon

Bunnin, Brad *(contributor)*
Attorney at Law, 14 Nicholl Av, Point Richmond CA 94801; 510 235 5177

Byte by Byte
9442A Capital of Texas Hwy N, Suite 650, Austin TX 87859; 512 795 0150, fax: 512 795 0021
Sculpt 3D

Cachet / EFI

Caere
100 Cooper Ct, Los Gatos CA 95030; 800 353 7226, 408 395 7000, fax: 408 354 2743
OmniPage Direct and Professional; Typist Plus Graphics

Cairo Shootout / Blehm, Dwane

Cal / Oster, David

CalComp Digitizer Products Group
14555 N 82nd St, Scottsdale AZ 85260; 800 458 5888, 602 948 6540, fax: 602 948 5508
DrawingBoard; Drawing Card

Calc+ / Abbott

Calculator Construction Set / Dubl-Click

Cal / David Oster

Canon USA
One Canon Plaza, Lake Success NY 11042; 516 488 6700, fax: 516 488 6092
BubbleJet printers; LX, CX and SX marking engines

CanOpener / Abbott

Canvas / Deneba

Capps, Tim and Mike Friese
15180 Transistor Ln, Huntington Beach CA 92649; 714 892 8199
RAM Check

Caps & Fractions / MacTography

CapsKiller / Hester, S. Kevin

Capture / Mainstay

Casa Blanca Works
148 Bon Air Ctr, Greenbrae CA 94904; 415 461 2227, fax: 415 461 2249
DriveShare

Casady & Greene
22734 Portola Dr, Salinas CA 93908 1119; 800 359 4920, 408 484 9228, fax: 408 484 9218
Glider; outline fonts; QuickDex; Super QuickDex

Casteel, Michael
Unison Software, 675 Almanor Av, Sunnyvale CA 94086; 408 245 3000
Klondike

Castle Systems Design
1306 Lincoln Av, San Rafael CA 94901 2105; 415 459 6495 (voice and fax)
display fonts

Cayman Systems
26 Landsdowne St, Cambridge MA 02139; 800 2 CAYMAN (tech support), 617 494 1999, fax: 617 349 3811
Ethernet cards; GatorBox

CD Technology
766 San Aleso Av, Sunnyvale CA 94086; 408 752 8500, fax: 408 752 8501
Porta Drive

CE Software
1801 Industrial Cir, Box 65580, West Des Moines IA 50265; 800 523 7638, 515 224 1995, fax: 515 224 4534
DiskTop; HeapFixer; MockPackage Plus Utilities; QuicKeys; QuickMail

Central Point Software
15220 NW Greenbrier Pkwy #200, Beaverton OR 97006; 503 690 8090, fax: 503 690 7133
MacTools

CH Products
970 Park Center Dr, Vista CA 92083; 800 624 5804, 619 598 2518, fax: 619 598 2524
RollerMouse

CheckFree
720 Greencrest Dr, Westerville OH 43081; 800 882 5280, 614 898 6000, fax: 614 898 6030
CheckFree

CheckMark Software
1520 Mulberry, Suite 200, Fort Collins CO 80524; 800 444 9922, 303 484 3541, fax: 303 484 0429
MultiLedger

ChipSoft
6330 Nancy Ridge Dr, San Diego CA 92121; 619 453 8722, fax: 800 453 1040
MacInTax

Chord Keypad *(aka The Bat)* / Infogrip

Christensen, Chris
6901 Chiala Ln, San Jose CA 95129
Columns

Christenson, Steve
Donations to: Packard Children's Hospital at Stanford, Development Department, 725 Welch Rd, Palo Alto CA 94304
SuperClock!

Citadel / Microcom

Citizen America
2450 Broadway, Suite 600, Santa Monica CA 90404; 310 453 0614, fax: 310 453 2814
Citizen PN48 Professional

C. Itoh Technology
2515 McCabe Way, Irvine CA 92713; 800 347 2484, 714 660 0506, fax: 714 757 4407
ImageWriter ribbons

Claris
5201 Patrick Henry Dr, Box 58168, Santa Clara CA 95052; 800 544 8554, 408 727 8227, fax: 408 987 7440
AppleWorks; Claris CAD; ClarisWorks; FileMaker Pro; HyperCard; MacDraw (II and Pro); MacPaint; MacWrite; Public Folder; Resolve; Stack Runner

Clarity / Welch, Andrew

Clear Lake Research
2476 Bolsover #343, Houston TX 77005; 713 523 7842
HyperArrays

Clement, Jerry *(Macintosh artist)*
45 Creek Rd, Fairfax CA 94930; 415 485 1535

ClickArt *(bitmap images)* / T/Maker

ClickPaste / MainStay

Cliffs StudyWare
Box 80728, Lincoln NE 68501 0728; 402 423 5050, fax: 402 423 9254
StudyWare for SAT

Clinton Electronics
6701 Clinton Rd, Rockford IL 61111; 800 447 3306, 815 633 1444, fax: 815 633 8712

ClipOut / T/Maker

The Clipper / Portfolio

The Cobb Group
Box 35160, Louisville KY 40232; 800 223 8720, 502 491 1900, fax: 502 491 8050
Macintosh journals

Coda Music Systems
1401 E 79th St, Bloomington MN 55425; 800 843 2066, 612 854 1288, fax: 612 854 4631
Finale; MusicProse

Coleman, Dale *(author, editor & consultant)*
630 Grand View #108, San Francisco CA 94114

Color Page monitors / E Machines

Color Pivot / Radius

ColorStudio / Fractal Designs

Color Test Pattern Generator / Pina, Larry

Columns / Christensen, Chris

Compact Pro / Cyclos

Compatibility Checker / Apple

CompileIt! / Heizer

Complete Undelete *(in 911 Utilities)* / MicroCom

CompuNet / Trimar USA

CompuServe
5000 Arlington Centre Blvd, Columbus OH 43220; 800 848 8199, 614 457 8600, fax: 614 457 0348
online service; Navigator

Computer:Applications
12813 Lindley Dr, Raleigh NC 27614; 919 846 1411
II In A Mac

Computer Associates International
One Computer Associates Plaza, Islandia NY 11788; 800 225 5224, 516 342 6000
Simply Accounting

Computer Covers Unlimited
7835 Mount Acadia, San Diego CA 92111; 800 PC COVERS, 619 277 0622, fax: 619 279 8220
cord organizers; The Keyboard Protector; Nycov dust covers; screen filters

Computer Science User Group / National Federation of the Blind

Connectix
2655 Campus Dr, San Mateo CA 94403; 800 950 5880, 415 571 5100, fax: 415 571 5195
Macintosh Memory Guide; Maxima; Optima; PowerBook Utilities; Virtual

Consolidated Printers
2630 8th St, Berkeley CA 94710; 510 843 8524, *contact:* Michelle Selby

CoStar
22 Bridge St, Greenwich CT 06830; 800 426 7827, 203 661 9700, fax: 203 661 1540
AddressWriter; Stingray

Coy, Gary
OutHouse Software, 1543 Kentucky, Lawrence KS 66044
Praxis

CryptoSolve / Martin, John and Person, Clyde

Curtis Manufacturing Company
30 Fitzgerald Dr, Jaffrey NH 03452; 800 548 4900, 603 532 4123, fax: 603 532 4116
mouse cleaning kit

Custom Applications
900 Technology Park Dr, Bldg 8, Billerica MA 01821; 800 873 4367, fax: 508 667 8821
Freedom of Press

Cutting Edge
1466 Pioneer Way #9, El Cajon Ca 92020; 800 257 1666, 619 441 6990, fax: 619 441 6999
monitors

Cyclos
Box 31417, San Francisco CA 94131
Compact Pro

Dafax Processing
Sam Neulinger, 14 North Ft, Melba NY 11357; 800 323 1751, 718 746 8220, fax: 718 746 1071
Lisa computer support

Dantz Development
1400 Shattuck Av, Suite 1, Berkeley CA 94709; 510 849 0293, fax: 510 849 1708
DiskFit Pro; Retrospect (& Remote)

Dark Castle / Aldus Consumer Division

Data Cannon / Storage Dimensions

Data Description
Box 4555, Ithaca NY 14852; 607 257 1000, fax: 607 257 4146
Data Desk

DataDesk International
9524 SW Tualatin Sherwood Rd, Tualatin OR 97062; 800 477 3473, 503 692 9600, fax: 503 691 1101
Mac 101E keyboard; Switchboard

DataPak / Mass Microsystems

Dataproducts
6219 De Soto Av, Woodland Hills CA 91365; 800 334 3174, 818 888 4242, fax: 818 887 4789
inkjet and laser printers

Data-Tech Institute *(aka Technology Interchange Group)*
Box 2429, Clifton NJ 07015; 800 638 5966
The Macintosh Survival Course

DataViz
55 Corporate Dr, Trumbull CT 06611; 800 733 0030, 203 268 0030, fax: 203 268 4345
MacLinkPlus

Davidson & Associates
Box 2961, Torrance CA 90509; 800 545 7677, 800 556 6141, fax: 310 793 0601
New Math Blaster Plus

DayMaker / Pastel

Dayna Communications
50 S Main St 5th Fl, Salt Lake City UT 84144; 800 531 0600, 801 531 0203, fax: 801 359 9135
DaynaDrive; DaynaFile II; DOS Mounter

DayStar Digital
5556 Atlanta Hwy, Flowery Branch GA 30542; 800 962 2077, 404 967 2077, fax: 404 967 3018
Fast Cache accelerator cards

dBASE IV *(PC database)* / Borland

Deck / Digidesign

DefaultFont *(in Font Charter)* / Dubl-Click

DeltaPoint
2 Harris Ct, Suite B1, Monterey CA 93940; 800 367 4334, 408 648 4000, fax: 408 648 4020
DeltaGraph; Taste

Delta Tao Software
760 Harvard Av, Sunnyvale CA 94087; 800 827 9316, 408 730 9336, fax: 408 730 9337
Strategic Conquest

Deneba Software
3305 NW 74th Av, Miami FL 33122; 800 622 6827, 305 594 6965, fax: 305 477 5794
Canvas; Spelling Coach Professional; UltraPaint

Design Science
4028 E Broadway, Long Beach CA 90803 1585; 800 827 0685 (sales only), 310 433 0685, fax: 310 433 6969
ParaFont

Desktop Photography / Comstock

DeskWriter / Hewlett Packard

DGR Technologies
1800 Rio Grande, Suite 205, Austin TX 78701; 800 235 9748, 512 476 9855, fax: 512 476 6399
read/write optical drives

Diconix M150 / Eastman Kodak

Digidesign
1360 Willow Rd, Suite 101, Menlo Park CA 94025; 800 333 2137, 415 688 0600, fax: 415 688 0777
Audiomedia II; Deck; Pro Tools; Sound Tools II

Digital Darkroom / Aldus

Director / Macromedia

Directory Assistance *(in Norton Utilities)* / Symantec

Disinfectant / Norstad, John

DiskCopy / Apple

Disk Doctor *(in Norton Utilities)* / Symantec

DiskDoubler / Salient

DisKeeper / Geagan, J.

DiskExpress / Alsoft

Disk First Aid / Apple

DiskFit Pro / Dantz

DiskFix *(in MacTools)* / Central Point

DiskTools *(in File Director)* / Fifth Gereration

DiskTop / CE Software

DiskTwin / Golden Triangle Computers

Diva
222 Third St, Cambridge MA 02142; 800 FYI DIVA, 617 491 4147, fax: 617 491 2208
VideoShop

DOS Mounter / Dayna Communications

Double Helix / Helix

Dove Computer
1200 N 23rd St, Wilmington NC 28405; 800 849 3297 (sales), 919 763 7918, 919 251 9441
acclerator cards; Ethernet cards; FaxModem+; memory upgrades

D'pix
Box 542, Columbus OH 43216 0572; 800 238 3749, 614 299 7192, fax: 614 294 0002
Folio

Drawing Card / CalComp

Dreams / Innovative Data Design

DriveSavers
Box 1191, Bonita CA 91908; 619 267 6777, fax: same
drive repair

DriveShare / Casa Blanca Works

Dr T's Music Software
124 Crescent Rd #3, Needham MA 02194; 800 989 MIDI (sales only), 617 455 1454, fax: 617 455 1460
Adventures in Musicland; Beyond

Doucette's Desktop
Box 690, Cedar Hill TX 75104; 214 291 4005
The Weigand Report

DTPrinter / Rosenthol, Leonard

Dubl-Click Software
22521 Styles St, Woodland Hills CA 91367 1730; 800 266 9525, 818 888 2068, fax: 818 888 5405
ArtRoundup; BigCaps; Calculator Construction Set; Font Charter; Menu-Fonts; PatternMover; WetPaint (clip art); World Class Fonts

Dunn, Nancy & Cameron
America Online: Nancy Dunn

Dutil, Marc E.
Box 299, Newport RI 02840
SQIX

Dynodex / Portfolio

Easterday, Bob
522 Loumena Ln, San Jose CA 95111
SCSI Info

Eastgate Systems
Box 1307, Cambridge MA 02238; 800 562 1638, 617 9259044, fax: 617 923 4575
Fontina

Eastman Kodak, Diconix Division
343 State St, Rochester NY 14650; 800 344 0006, fax: 716 726 3108
Diconix M150

easyPrint / SF/O

Edmark
Box 3218, Redmond WA 98073 3218; 800 426 0856, 206 861 8200, fax: 206 861 8998
TouchWindow

Educorp *(sales only)*
7434 Trade St, San Diego CA 92121; 800 843 9497, 619 536 9999, fax: 619 536 2345
Wraptures One

Effects Specialist / Postcraft

EFI *(Electronics for Imaging)*
950 Elm Av, Suite 300, San Bruno CA 94066; 800 285 4565, 415 742 3400, fax: 415 737 5018
Cachet

Ehman *(aka Bridgette)*
1466 Pioneer Way, El Cajon CA 92020; 800 257 1666, 619 441 6990, fax: 619 441 6999
hard disks

Electric Typographer (see Sutcliffe, Judith)

Electronic Arts
1450 Fashion Island Blvd, San Mateo CA 94404; 800 245 4525, 415 571 7171, fax: 415 571 8004
PGA Tour Golf; Studio/1; Studio/8; Studio/32

Emac
48431 Milmont Dr, Fremont CA 94538; 800 821 0806, 510 498 1111, fax: 510 651 4322
Silhouette

E Machines
9305 SW Gemini Dr, Beaverton OR 97005; 800 344 7274, 503 646 6699, fax: 503 641 0946
Color Page monitors

Em Software
Box 402, Westbrook CT 06498; 800 253 8472, 203 399 8472, fax: 203 399 2447
Xstyle

Encore / Passport Designs

EncryptInit / Kent•Marsh

Engineered Software
615 Guilford Jamestown Rd, Greensboro NC 27409; 919 299 4843, fax: 919 852 2067
PowerDraw

Enhance / MicroFrontier

Ensign Systems
26 N Main, Suite B, Layton UT 84041; 801 546 1616, fax: 801 546 6490
POS-IM

Envisio
510 First Av N, Suite 303, Minneapolis MN 55403; 612 3391008, fax: 612 339 1369
memory expansion/video cards

Epson America
20770 Madrona Av, Torrance CA 90503; 800 922 8911, 310 782 0770, fax: 310 782 5220
printers

ErgoSource
2828 Hedberg Dr, Minnetonka MN 55343; 800 969 4374, 612 595 0881, fax: 612 595 0884
Macintosh ergonomic supplies

Ergotron
3450 Yankee Dr #100, Eagan MN 55121; 800 888 8458, 612 452 8135, fax: 612 452 8346
MacTilt; other tilt/swivel bases

Ethernet cards / Apple, Asanté, Cayman, Dove, Novell, 3Com

EtherPeek / AG Group

Ettore, Riccardo
67 Rue de la Limite, 1970 W Oppen, Belgium
SndControl; Sound Mover

Excel / Microsoft

ExperVision
3590 N First St, San Jose CA 95134; 800 732 3897, 408 456 9988, fax: 408 456 0823
TypeReader

Exposure Pro / Baseline

Extensions Manager / Batista, Ricardo

EZ Music, EZ Vision / Opcode

Farallon Computing
2000 Powell St, #600, Emeryville CA 94608; 800 344 7489, 510 596 9100, fax: 510 596 9020
Ethernet cards; Liaison; PhoneNet products; repeaters; StarController (& EN); Timbuktu (& Remote)

Far Side Computer Calendar / Amaze

Fastback Plus / Fifth Generation

Fast Cache accelerator cards / DayStar

FastPath / Shiva

FaxModem+ / Dove

FaxSTF / STF

Fedit Plus / Mitchell, John

Felix / Altra

Fiems, Guy
Av Leopold III 77, B 1970 Wezembeek Oppem, Belgium
Tidy It Up!

Fifth Generation Systems
10049 N Reiger Rd, Baton Rouge LA 70809; 800 873 4384, 504 291 7221, fax: 504 295 3268
Fastback Plus; File Director; Pyro; Suitcase II

File / Microsoft

File Director / Fifth Generation

File Exchange Software / Apple

File Force / Acius

FileMaker Pro / Claris

FileSaver *(in Norton Utilities)* / Symantec

FilmMaker / Macromedia

Finale / Coda Music

FindCursor Init / Samuels, Mike

Findswell / Working Software

1st Aid HFS *(in 911 Utilities)* / Microcom

First Ever Clam & Craft Cookbook / Millimac

FlashWrite / Welch, Andrew

Fluent Laser Fonts Library / Casady & Greene

FolderBolt / Kent•Marsh

Folio / D'pix

Font Charter / Dubl-Click

The Font Company
7850 E Evans Rd, Scottsdale AZ 85260; 800 442 FONT, 602 998 9711, fax: 602 998 7964
PostScript fonts

Font Info / Regional Typographers

Fontastic Plus / Altsys

FontBank
2620 Central St, Evanston IL 60201; 708 328 7370, fax: 708 328 7491
PostScript and TrueType display fonts

FontDisplay / Shulman Software

Fontek / Letraset

FontHaus
15 Perry Av, Suite A8, Norwalk CT 06850; 800 942 9110, 203 846 3087, fax: 203 849 8527
PostScript fonts

Fontina / Eastgate

FontMonger / Ares

Fontographer / Altsys

FontShop International
401 Wellington St W, Toronto ON Canada M5V 1E8; 800 36 FONTS, 416 348 9837, fax: 416 593 4318
PostScript fonts

FontSizer / U.S. MicroLabs

FontStudio / Letraset

Form & Function
1595 17th Av, San Francisco CA 94122; 800 843 9497, 415 664 4010, fax: 415 664 4030
Wraptures One (for sales see Educorp)

Form•Z / Auto•des•sys

4th Dimension / Acius

4th Dimension *(BBS)*
Cambridge MA; modem: 617 494 0565

4th Power / Honeybee

Fox Software
134 W South Boundary, Perrysburg OH 43551; 800 837 3692, 419 874 0162, fax: 419 894 8678
FoxBASE+/Mac

Fractal Design
335 Spreckels Dr, Suite F, Aptos CA 95003; 408 688 8800 (sales only), 408 688 5300, fax: 408 688 8836
ColorStudio (Formerly by Letraset USA); Painter

Frame Technology
1010 Rincon Dr, San Jose CA 95131; 800 U4 FRAME, 408 433 3311, fax 408 433 1928
FrameMaker

Freedom of Press / Custom Applications

FreeSoft Company
105 McKinley Rd, Beaver Falls PA 15010; 412 846 2700, fax: 412 847 4436
White Knight

FreeHand / Aldus

FreeTerm / Bond, Bill

Frontier / UserLand

Full Impact / Borland

FullWrite Professional / Borland

FWB
2040 Polk St, Suite 215, San Francisco CA 94109; 415 474 8055, fax: 415 775 2125
Hard Disk ToolKit; Hammer hard drives

Fyock, Lee
520 Boston Rd, Billerica MA 01821
Wavicle

Gallery Effects / Aldus Consumer Div

Garnevale, Giuseppe
via Niutta 36 80128, Napoli Italy
BAD

Gatekeeper / Johnson, Chris

GatorBox / Cayman

GCC Technologies *(General Computer)*
580 Winter St, Waltham MA 02154; 800 422 7777, 617 890 0880, fax: 617 890 0822
hard disks; laser and inkjet printers

GDT Softworks
4664 Lougheed Hwy, Suite 188, Burnaby BC Canada V5C 6B7; 800 663 6222, 604 291 9121, fax: 604 291 9689
BetterWriters; PowerPrint

Geagan, J.
7 H Laurel Hill Rd, Greenbelt MD 20070
DisKeeper

Generation Systems
2648 Patton Rd, St Paul MN 55113; 800 325 5811, 612 633 5222, fax: 612 633 1083
external monitors; video-out NuBus cards

Generic CADD / Autodesk

Geometer's Sketchpad / Key Curriculum

Glider / Casady & Greene

GNU Chess / André, Airy

GOfer / Microlytics

GO hard disk mechanism / Quantum

Go Junior / Toyogo

Gold Brick / Transfinite

Gold Disk
5155 Spectrum Way #5, Mississauga ON Canada L4W 5A1; 800 465 3375, 416 602 4000, fax: 416 602 4001
Animation Works

Golden Triangle Computers
4849 Ronson Ct, San Diego CA 92111; 800 326 1858, 619 279 2100, fax: 619 279 1069
DiskTwin; TwinIt

Go Master / Toyogo

GooPanel / Bollinger, Steve

Graphic Management Group
1003 Summit Lake Dr, Valhalla NY 10595; 800 346 6828; 914 769 7800, fax: 914 769 8951
Aperture Networker; Aperture Pro

Graphisoft
400 Oyster Point Blvd, Suite 429, South San Francisco CA 94080; 800 344 3468, 415 737 8665, fax: 415 871 5481
ArchiCAD

Graphsoft
8370 Court Av, Suite 202, Ellicott City MD 21043; 410 461 9488, fax: 410 461 9345
MiniCad+

Gravis Computer / see Advanced Gravis

Great Gantt! / Varcon

Great Plains Software
1701 38th St SW, Fargo ND 58103; 800 456 0025, 701 281 0550, fax: 701 281 3322
Great Plains Accounting

Great Wave Software
5353 Scotts Valley Dr, Scotts Valley CA 95066; 408 438 1990, fax: 408 438 7171
ConcertWare+; KidsTime; NumberMaze

GreatWorks / Symantec

Group Technologies
1408 N Fillmore St, Suite 10, Arlington VA 22201; 800 476 8781, 703 528 1555, fax: 703 528 3296
Aspects

Gum-P / After Hours

Hammer hard drives / FWB

Hammermill/International Paper
1540 E Lake Rd, Erie PA 16533; 814 456 8811
laser printer paper

HandiWorks / MacVonk • USA

Hangman Plus / Winograd, Ken

Hard Disk ToolKit / FWB

Hauer, David *(writer)*
1641 Allston Way, Berkeley CA 94703

Hayes Microcomputer Products
5953 Peachtree Industrial Blvd, Norcross GA 30092; 404 840 9200, fax: 404 447 0178
modems

Headmaster / Prentke Romich

HeapFixer / CE Software

HeapTool / Clendinning, Kerry

Heizer Software
Box 232019, Pleasant Hill CA 94523; 800 888 7667, 510 943 7667, fax: 510 953 6882
CompileIt!; Excel add-on packages; tax templates

Helix Technologies
4100 Commercial Av, Northbrook IL 60062; 800 364 HELX, 708 498 8852, fax: 708 291 7091
Double Helix

Help! / Teknosys

Hewlett Packard
3000 Hanover St, Palo Alto CA 94303 0890; 800 752 0900, 415 857 1501, fax: 415 857 5518
DeskWriter; LaserJet

Hidden Agenda / Scholastic

HJ 100i / Brother

Holzgrafe, Rick
Semicolon Software, Box 371, Cupertino CA 95015 0371
Scarab of Ra

HoneyBee Software
500 Rene Levesque Blvd W, Suite 1000, Montreal PQ Canada H2Z 1W7; 800 667 1233, 514 954 0354, fax: 514 875 4230
Fourth Power accounting sofware

Howard, Stephen *(contributor)*
c/o *MacWeek*

HyperActive Software
5226 W Nokomis Pkwy, Minneapolis MN 55417; 612 724 1596
font sample catalogs

HyperArrays / Clear Lake Research

HyperCard / Claris

Icom Simulations
648 S Wheeling Rd, Wheeling IL 60090; 800 877 ICOM, 708 520 4440, fax: 708 459 3418
OnCue II

Illustrator / Adobe

Image Club Graphics
1902 11th St SE, Suite 5, Calgary AB Canada T2G 3G2; 800 661 9410, 403 262 8008, fax: 403 261 7013
ArtRoom (clip art); LetterPress (fonts)

ImageWriter / Apple

Imaging Products
12696 Rockhaven Rd, Chesterland OH 44026; 216 285 2813, fax: 216 285 4516
laser printer labels, paper and transparencies

Imprimatur Design Systems
955 Massachusetts Av, Cambridge MA 02139; 617 864 7744, fax: 617 864 0035
PostScript fonts

In Control / Attain

Indiana Jones & the Last Crusade / LucasArts

Individual Software
5870 Stoneridge Dr #1, Pleasanton CA 94588; 800 822 3522, 510 734 6767, fax: 510 734 8337
Excel add-on packages; PowerMacros

Infini D / Specular

Infinity 40 Turbo drive / PLI

Infogrip
5800 One Perkins Pl #5F, Baton Rouge LA 70808; 800 397 0291, 504 766 8082, fax: 504 766 4228
Chord Keypad (aka The Bat)

Informed Designer, Informed Manager / Shana

Inforum / MacVonk•USA

InitInfo Pro / Baseline

InitPicker / Microseeds

Inline Design
308 Main St, Lakeville CT 06039 1204; 800 453 7671, 203 435 4995, fax: 203 435 1091
Swamp Gas

Innovative Data Design *(IDD)*
135 D Mason Cir, Concord CA 94520; 510 680 6818, fax: 510 680 1165
Dreams; MacDraft II

Insight series / Peachtree

Insignia Solutions
526 Clyde Av, Mountain View CA 94043; 800 848 7677, 415 694 7600, fax: 415 964 5434
AccessPC; SoftAT; SoftPC

Insite Peripherals
4433 Fortran Dr, San Jose CA 95134; 408 946 8080, 408 946 4403
floptical drives

Insomnia / Somogyi, Stephen

Instant Address Book / Portfolio

Instant Update / On Technology

Instant-Wake *(in PowerBook Utilities)* / Connectix

Intelligent Instrument / Dr T's Music

InterFax 24/96 / Abaton

Intergraph
289 Dunlop Blvd, Huntsville AL 35894; 800 345 4856, 205 730 2000, fax: 205 730 9491
MicroStation Mac

Interplay
3710 S Susan, Santa Ana CA 92704; 800 969 GAME, 714 545 9001, fax: 714 549 5075
Battle Chess

Inter•Poll / Apple

InTouch / Advanced

Intuit
155 Linfield Dr, Menlo Park CA 94025; 800 624 8742, 415 322 0573, fax: 415 322 1599
Quicken

Iomega
1821 W 4000 S, Roy UT 84067; 800 456 5522, 801 778 3000, fax: 801 778 3460
Bernoulli drives

ITC *(International Typeface Corporation)*
866 2nd Av, New York NY 10017; 800 634 9325, 212 371 0699, fax: 212 752 4752
outline fonts

JAG / Ray Dream

JetFill
1907 N Lamar, Suite 250, Austin TX 78705; 800 749 2993, 512 479 8400, fax: 512 479 8418
inkjet cartridge refills

JMP / SAS Institute

JoliWrite / Widemann, Benoît

Kawai America
Box 9045, Compton CA 90224; 800 421 8048, 310 631 1771, fax: 310 604 6913
K series MIDI keyboards

Keller, Debra *(copy-editing)*
849 Swanston Dr, Sacramento CA 95818

Kensington Microware
2855 Campus Dr, San Mateo CA 94403; 800 535 4242, 415 572 2700, fax: 415 572 9675
cables; floor stands; screen filters; tilt/swivel stands; trackballs; TurboMouse

Kent•Marsh
3260 Sul Ross St, Houston TX 77098; 800 325 3587, 713 522 5625, fax: 713 522 8965
EncryptInit; FolderBolt

Keyboard Protector / Computer Covers

Key Curriculum Press
Box 2304, Berkeley CA 94702; 800 338 7638, 510 548 2304, fax: 510 548 0755
The Geometer's Sketchpad

KeyFinder *(in Norton Utilities)* / Symantec

Kid Pix / Brøderbund

KidsTime / Great Wave

Kiwi Software
6546 Pardall Rd, Santa Barbara CA 93117; 800 321 5494, 805 685 4031, fax: 805 968 1932
KiwiEnvelpoes!

Klondike / Michael Casteel

Kodak—*see Eastman Kodak*

Kodani, Hiroyuki
Blocker

Koontz, Ty *(indexer)*
5020 Rock Canyon Rd, Tucson AZ 85715; 602 529 1788

Koss
4129 N Port Washington Av, Milwaukee WI 53212; 800 558 8305, 414 964 5000, fax: 414 964 8615
SA 30 amplified speakers

K series MIDI keyboards / Kawai America

La Cie
8700 SW Creekside Pl, Beaverton OR 97005; 800 999 0143, 503 520 9000, fax: 520 9100
hard drives; Silverlining

LapLink Mac / Traveling Software

Lari, Humayun S.
LightningPaint

Laserboard New York *(BBS)*
Queens NY; modem: 718 639 8826

Laser Factory
915 Terminal Way, San Carlos CA 94070; 800 359 5777, 415 595 4000, fax: 415 595 5600
toner cartridge refills

LaserJet / Hewlett Packard

LaserMaster
7156 Shady Oak Rd, Eden Prairie MN 55344; 800 950 6868, 612 944 9330, fax: 612 944 0522
Unity 1000 and other laser printers

LaserStatus *(in MockPackage Plus)* / CE Software

LaserWriters / Apple

LaserWriter Utility / Apple

Last Resort / Working Software

Lazy Dog Foundry
316 Bates Av, St. Paul MN 55106; 800 876 9807, 612 291 0306, fax: 612 291 0481
outline fonts; custom font service

The Learning Company
6493 Kaiser Dr, Fremont CA 94555; 800 852 2255, 510 792 2101, fax: 510 792 9628
Reader Rabbit; Super Solvers OutNumbered!

Leitch, Jim
61 Shaughnessy Blvd, Willowdale ON Canada M2J 1H9; fax: 416 496 0802
Address Book; Set Clock

Lester / Lightwave

Letraset USA
40 Eisenhower Dr, Paramus, NJ 07653; 800 343 8973, 201 845 6100, fax: 201 845 4708
Fontek; FontStudio; LetraStudio

Letter•Perfect
6606 Soundview Dr, Gig Harbor WA 98335; 206 851 5158, fax: 206 851 1158
PostScript fonts

LetterPress / Image Club

Letter Writer Plus / Power Up

Lewis, Hal *(technical illustrations)*
Apple-day Graphics, 1167 Burrows, San Francisco CA 94134; 415 586 0571

Liaison / Farallon

Liberty Systems
160 Saratoga Av #38, Santa Clara CA 95051; 408 983 1127, fax: 408 243 2885
floppy, floptical and hard disks

LightningPaint / Lari, Humayun S.

LightningScan / Thunderware

Lightwave Technologies
16595 W Easton Av, Prairie View IL 60069; 708 634 1700, fax: 708 634 1880
Lester

Lim, John
18 Nottingwood St, Doncaster E 3109, Victoria Australia
Moiré

Lindenberg, Joachim
Roonstrasse 26c, W 7500 Karlsruhe 1, Germany; AppleLink GER.XSE0010
Broadcast

Linotype Hell
425 Oser Av, Hauppauge NY 11788; 800 633 1900, 516 434 2000, fax: 516 434 2706
imagesetters

Living Trust / Nolo

LocalPeek / AG Group

LocalTalk / Apple

Logitech
6505 Kaiser Dr, Fremont CA 94555; 510 795 8500, 510 792 8901
MouseMan; ScanMan 32; TrackMan

Lookup / Working Software

Loom / LucasArts

Lotus Development
55 Cambridge Pkwy, Cambridge MA 02142; 800 343 5414, 617 577 8500, fax: 617 693 3981
Lotus 1 2 3

LucasArts Entertainment
LucasArts Games Division, Box 10307, San Rafael CA 94912; 800 STAR WAR, 415 721 3300, fax: 415 721 3342
Indiana Jones & the Last Crusade; Loom

L View Display System / Sigma Designs

Mac Warehouse
1690 Oak St, Lakewood NJ 08701 3013; 800 255 5227, 908 367 0440, fax: 908 905 9279

MacCable line / Monster Cable

MacCalc / Bravo

MacConnection
14 Mill St, Marlowe NH 03456; 800 334 4444, 800 622 5472 fax: 603 446 7791
mail-order Mac products

MacBravo! Facilities / Schlumberger

MacDraft / Innovative Data Design

MacDraw and Pro / Claris

MacGard / Systems Control

MacInfo *(BBS)*
Newark CA; modem: 510 795 8862

MacInTax / ChipSoft

Macintosh computers / Apple *[If you need this entry, you're in serious trouble.—AN]*

Macintosh Memory Guide / Connectix

Macintosh PC Exchange / Apple

Macintosh Product Registry / Redgate

Macintosh Survival Course / Data-Tech

MacLabel Pro / Avery Dennison

MacLinkPlus/Translators / DataViz

Macman / Butler, John

MacMoney / Survivor Software

MacNet / Connect

Mac 101E Keyboard / DataDesk

MacPaint / Claris

MacProducts USA
608 W 22nd St, Austin TX 78705 5116; 800 622 3475, 512 472 8881, fax: 512 499 0888
Magic drives

MacRecorder / Macromedia

MacRenderMan / Pixar

Macromedia
600 Townsend, San Francisco CA 94103; 800 288 4797, 415 442 0200, fax: 415 442 0190
Accelerator; Director; FilmMaker; MacRecorder; MacroMind Three D; ModelShop; SoundEdit Pro; SwivelMan; Swivel 3D

MacroMind Three D / Macromedia

MacTable / ScanCo

MacTilt / Ergotron

MacTools / Central Point

MacTopas / AT&T Graphics

MacTrac / MicroSpeed

MacUser
950 Tower Ln 18th Fl, Foster City CA 94404; 800 627 2247 (subscriptions), 415 378 5600, fax: 415 378 6903

MacVonk•Canada
940 6th Av SW #1100, Calgary AB Canada T2P 3T1; 403 232 6545, fax: 403 232 6425
RagTime

MacVonk•USA
313 Iona Av, Narberth PA 19072; 215 660 0606, fax: 215 668 4360
HandiWorks; Inforum; NetOctopus

MacWeek
301 Howard St, San Francisco CA 94105; 415 243 3551

Macworld
501 Second St, Suite 500, San Francisco CA 94107; 800 288 6848 (subscriptions), 415 243 0505, fax: 415 442 0766

MacWrite / Claris

Magendanz, Chad
207 Shannon Dr SE, Bainbridge Island WA 98110; 206 780 0608
SCSI Accelerator

Magic drives / MacProducts USA

Magic Software
2239 Franklin St, Bellevue NE 68005; 800 342 6243, 402 291 0670, fax 402 291 1211
PowerIcons

Mail / Microsoft

Mainstay
5311 B Derry Av, Agoura Hills CA 91301; 818 991 6540, fax 818 991 4587
Capture; ClickPaste

Maitreya Design
Box 12085, Eugene OR 97440; 503 342 2834
miniWriter

***Maki, Ken** (technical editor)*
Systems Management Consulting, 3924 Webster St, Oakland CA 94609; AppleLink: KMaki

Managing Your Money / Meca

Manhattan Graphics
250 E Hartsdale Av, Hartsdale NY 10530; 800 572 6533, 914 725 2048, fax: 914 725 2450
Ready,Set,Go!

Mariah / Symmetry

Martin, John and Clyde Person
CryptoSolve

Mass Microsystems
810 W Maude Av, Sunnyvale CA 94086; 800 522 7979, 408 522 1200, fax: 408 733 5499
DataPak cartridge drives; Rival monitors

***MasterFinder** (in File Director)* / Fifth Generation

Master Tracks Pro / Passport Designs

MasterJuggler / Alsoft

***Matazzoni, Joe** (writer)*
433 Cavour St, Oakland CA 94618

Maxa
116 N Maryland Av, Suite 100, Glendale CA 91206; 800 788 6292, 818 5431300, fax: 818 543 0104
Snooper

Maxima / Connectix

Maxis
Two Theatre Sq, Suite 230, Orinda CA 94563 3041; 800 33 MAXIS, 510 254 9700, fax: 510 253 3736
SimCity Supreme

Maxtor
211 Riveroaks Pkwy, San Jose CA 95134; 800 262 9867, 408 432 1700, fax: 408 432 4698
hard drives

McFarlane, Garrick
4 Churchill Rd, Wimborne Dorset, BH21 2AU UK
Sample Editor

MCI Mail
1111 19th St NW #500, Washington DC 20036; 800 444 6245, 202 833 8484, fax: 202 416 5858
e-mail service

Meca Software
55 Walls Dr, Fairfield CT 06430 0912; 800 288 6322, 203 255 7562, fax: 203 256 5195
Managing Your Money

Meeting Maker / On Technology

MEI/Micro Center
1100 Steelwood Rd, Columbus OH 43212; 800 634 3478, 614 481 4417, fax: 614 486 6417
floppy disks

MenuFonts / Dubl-Click

Metamorphosis Professional / Altsys

Metatec
7001 Discovery Blvd, Dublin OH 43017; 800 637 3472, 614 761 2000, fax: 614 761 4110
Nautilus

***Meyer, Chuck** (technical editor)*
2450 Warring #21, Berkeley CA 94704

Meyer Software
616 Continental Rd, Hatboro PA 19040; 215 675 3890, fax: 215 675 3873
On The Air

Microcom Software Division
500 River Ridge Dr, Norwood MA 02062; 800 822 8224, 617 551 1000, fax: 617 551 1968
Citadel; 911 Utilities

MicroFrontier
3401 101st St, Suite E, Des Moines IA 50322; 800 388 8109, 515 270 8109, fax: 515 278 6828
Enhance

MicroLaser PS17 / Texas Instruments

Microlytics
Two Tobey Village Office Pk, Pittsford NY 14534; 800 828 6293, 716 248 9150, fax:716 248 3868
GOfer; Word Finder Plus

MicroNet Technology
20 Mason, Irvine CA 92718; 714 837 6033, fax: 714 837 1164
hard drives; NuPort

MicroPhone / Software Ventures

Microseeds
2A Dorset Ln, Williston VT 05495; 800 453 7671, 802 879 3365, fax: 802 879 4602
InitPicker; Redux; Rival; Screen Gems

Microsoft
One Microsoft Way, Redmond WA 98052; 800 426 9400, 206 882 8080, fax: 206 936 7329
Excel; File; Mail; Office; PowerPoint; Schedule+; Word; Works

MicroSpeed
44000 Old Warm Springs Blvd, Fremont CA 94538; 800 232 7888, 415 490 1403, fax: 415 490 1665
MacTrac; MicroTrac

MicroStation Mac / Intergraph

MicroTech International
158 Commerce St, East Haven CT 06512; 800 626 4276, 203 468 6223, fax: 203 467 8124
hard drives; SyQuest drives; Transport

MicroTouch Systems
55 Jonspin Rd, Wilmington MA 01887 9865; 800 866 6873, 508 694 9900, fax: 508 694 9980
The UnMouse

MicroTrac / MicroSpeed

MIDI Interface / Passport Designs

MIDI keyboards / Roland, Yamaha

MIDI Translator / Opcode

Miller, John / see Big Fish

Millimac Licensing
188 Michael Way, Santa Clara CA 95051; 408 984 0700, fax: 408 984 7456
The First Ever Clam & Craft Cookbook

MiniCad+ / Graphsoft

miniWriter / Maitreya Design

Minor Repairs *(in 911 Utilities)* / Microcom

Mirror *(in MacTools)* / Central Point

Mirror Technologies
2644 Patton Rd, Roseville MN 55113; 800 654 5294, 612 633 4450, fax: 612 633 3136
hard drives; monitors; scanners

Miserey, Frédéric
UnScrolly

Mitchell, John
MacMaster Systems, 108 E Fremont, Suite 37, Sunnyvale CA 94087; 408 773 9834
Fedit Plus

MNP Support / Microcom

Mobius Technologies
1125 Atlantic Av #100, Alameda CA 94501; 800 523 7933, 510 654 0556, fax: 510 523 8452
monitors

MockPackage Plus Utilites / CE Software

Mode32 / Apple

ModelShop II / Macromedia

Moiré / Lim, John

Monotype
53 W Jackson Blvd #504, Chicago IL 60604; 800 666 6897, 312 855 1440, fax: 312 939 0378
fonts

Monroe, Fred
AppleLink: fredom; 408 862 3053 (summer), 313 662 4073 (fall)
Basura

Monster Cable Products
274 Wattis Way, S San Francisco CA 94080; 415 871 6000, fax: 415 871 6555
MacSpeakers

More / Symantec

More Disk Space / Alysis

mouse cleaning kit / Curtis

MouseMan / Logitech

MousePen Pro / Appoint

MouseStick / Advanced Gravis

Mr File / Softways

Multi-Ad Services
1720 W Detweiller Dr, Peoria IL 61615; 800 447 1950, 309 692 1530, fax: 309 692 5444
Multi-Ad Creator; Multi-Ad Search

MultiClip / Olduvai

MultiLedger / CheckMark

MultiMaster *(in Now Utilities)* / Now Software

MusicProse / Coda Music

My DataBase / ShopKeeper

M.Y.O.B. / Teleware

myWord! / Helme, Pete

National Federation of the Blind
1800 Johnson St, Baltimore MD 21230; 410 659 9314, fax: 410 685 5653
Computer Science User Group

National Tele-Press
Box 98, Newton MA 02159; 800 448 0988, 617 332 5507
SuperMOM

Nautilus / Metatec

Navigator / CompuServe

NEC Technologies
Professional Systems Division, 1255 Michael Dr, Wood Dale IL 60191; 800 388 8888, 708 860 9500, fax: 708 860 5812
CD ROM drives; monitors; Silentwriter

NetModem / Shiva

NetOctopus / MacVonk•USA

NetSerial / Shiva

Network Resources Corporation (NRC)
736 S Hillview Dr, Milpitas CA 95035; 408 263 8100, fax: 408 263 8121
Ethernet cards

New Horizons Software
206 Wild Basin Rd #109, Austin TX 78746; 512 328 6650, fax: 512 328 1925
WordMaker

New Math Blaster Plus / Davidson

NewTec
215 SE 8th St, Topeka KS 66603; 800 847 6111, 913 354 1146, fax: 913 231 0101
Video Toaster

911 Utilities / Microcom

Nisus Software *(formerly Paragon Concepts)*
107 S Cedros Av, Solana Beach CA 92075
1900; 800 922 2993, 619 481 1477, fax:
619 481 6154
Nisus; Nisus Compact

Nolo Press
950 Parker St, Berkeley CA 94710;
510 549 1976, fax: 510 548 5902
Living Trust; Personal RecordKeeper;
WillMaker; self-help legal guides

Norstad, John
Academic Computing & Network Service,
Northwestern University, 2129 Sheridan Rd,
Evanston IL 60208
Disinfectant

Norton Utilities / Symantec

Norton, W.W.
500 Fifth Av, New York NY 10110; 800
233 4830, 212 354 5500, fax: 800 458 6515
The Blind Watchmaker

Novell
2180 Fortune Dr, San Jose CA 95131; 800
526 5463 (sales only), 408 434 2300, fax:
408 954 9930
Ethernet cards

NowMenus *(in Now Utilities)* / Now Software

Now Software
319 SW Washington St 11th Fl, Portland OR
97204; technical support: 503 274 2810,
503 274 2800, fax: 503 274 0670
Now Utilities

NP60APL / AEG/Olympia

NRC / *see* Network Resources Corporation

NumberMaze / Great Wave

NuPort / MicroNet

Nycov covers / Computer Covers

Oasis / Time Arts

Odonian Press
Box 7776, Berkeley CA 94707; 510 4083,
510 524 3143, fax: 510 524 4185
The Real Story series

Office / Microsoft

Okidata
532 Fellowship Rd, Mount Laurel NJ 08054;
609 235 2600, fax: 609 778 4184
printers

Olduvai
7520 Red Rd, South Miami FL 33143; 800
822 0772, 305 665 4665, fax: 305 665 0671
MultiClip

Olympia */see* AEG/Olympia

OmniPage Direct and Professional / Caere

Omnis 7 / Blyth

OnCue / Icom Simulations

1-2-3 / Lotus

On Technology
155 Second St, Cambridge MA 02141; 800
548 8871, 617 876 0900, fax: 617 876 0391
Instant Update; Meeting Maker

On The Air / Meyer Software

Opcode Systems
3950 Fabian Way, Suite 100, Palo Alto CA
94303; 415 856 3333, fax: 415 856 3332
EZ Music Starter Kit; EZ Vision; MIDI
Translator; Studio Plus Two; Vision

Optima/32 / Connectix

Oster, David
Mosaic Codes, 2140 Shattuck Av, Suite
2036, Berkeley CA 94704
Cal

Outbound Systems
4840 Pearl East Cir, Boulder CO 80301; 800
444 4607, 303 786 9200, fax: 303 786 8611
portable Macs

Pacer Software
7911 Herschel Av, Suite 402, La Jolla CA
92037; 619 454 0605, 619 454 6267
PacerForum

Pacman / M. Tsuji

The Page / PageWorks

Page Studio Graphics
3175 N Price Rd #1050, Chandler AZ
85224; 602 839 2763 (voice and fax)
PIXymbols fonts

PageMaker / Aldus

PageWorks
Box 14493, Chicago Il 60614;
312 348 1200, fax: 312 404 0717
The Page

Painter / Fractal Design

Panamax
150 Mitchell Blvd, San Rafael CA 94903; 800
472 5555, 415 499 3900, fax: 415 472 5540
surge protectors

Panorama / ProVue

Paper Direct
205 Chubb Av, Lyndhurst NJ 07071 0618; 800
272 7377, 201 507 5488, fax: 201 507 0817
laser printer paper

ParaFont / Design Science

Partridge, Bruce
1209 S 25th St, Lincoln NE 68502;
402 476 2739
Sav-O-Matic

Passport Designs
100 Stone Pine Rd, Half Moon Bay CA 94019; 415 726 0280, fax: 415 726 2254
Encore; Master Tracks Pro; MIDI Interface; Turbo Trax

Pastel Development
113 Spring St, New York NY 10012; 800 756 8553 (sales), 212 941 7500, fax: 212 431 3079
DayMaker

Pattern 100 / Atlantic

PatternMover DA / Dubl-Click

Peachpit Press
2414 Sixth St, Berkeley CA 94710; 800 283 9444, 510 527 8555, fax: 510 548 5991
Macintosh books

Peachtree Software
1505 Pavilion Pl, Norcross GA 30093; 800 247 3224, 404 564 5800, fax: 404 564 5888
Accounting series; Insight

Personal Laser Printer / GCC

Personal LaserWriters / Apple

Personal Press / Aldus

Personal RecordKeeper / Nolo

Personal Training Systems
828 S Bascom Av, Suite 100, San Jose CA 95128; 800 832 2499, 408 286 3843, fax: 408 977 1166
interactive audio training (for QuarkXPress)

Persona Technologies/*see* Monster Cable Products

Persuasion / Aldus

PGA Tour Golf / Electronic Arts

PG Music
111 266 Elmwood Av, Buffalo NY 14222; 800 268 6272, 416 528 2368, fax: 416 577 4704
Band in a Box Professional

PhoneNet / Farallon

PictureBook+ / Loop Software is now defunct; the product was sold to Now Software for inclusion in next version of Now Utilities

Pina, Larry
47 Meadow Rd, Westport MA 02790
Test Pattern Generator

Pivot monitors / Radius

Pixar
1001 W Cutting Blvd, Richmond CA 94804; 800 937 3179, 510 236 4000, fax: 510 236 0388
MacRenderMan; Showplace

The Playroom / Brøderbund

PLI *(Peripheral Land)*
47421 Bayside Pkwy, Fremont CA 94538; 800 288 8754, 510 657 2211, fax: 510 683 9713
CD ROM drives; Infinity 40 Turbo hard drive; SyQuest removable hard drives

Plus / Spinnaker

PMMU chip / Connectix

Polic, Robert
29 Dunslee Way, Scotts Valley CA 95066
SCSI Probe

PopChar / Blaschek, Günther

Porta Drive / CD Technology

Portfolio Systems
10062 Miller Av, Suite 201, Cupertino CA 95014; 800 729 3966, 408 252 0420, fax: 408 252 0440
Dynodex; Instant Address Book; SmartScrap and the Clipper; Super Glue

POS-IM / Ensign

Postcraft International
27811 Hopkins Av, Suite 6, Valencia CA 91355; 805 257 1797, fax: 805 257 1759
Effects Specialist

PowerBook Utilities / Connectix

PowerBoost Utilities / Baseline

PowerDraw / Engineered

Powered Partners / Acoustic Research

PowerIcons / Magic

PowerMacros / Individual

PowerPoint / Microsoft

PowerPrint / GDT

PowerStation *(in File Director)* / Fifth Generation

Power Up Software
2929 Campus Dr, Box 7600, San Mateo CA 94403; 800 851 2917, 415 345 5900, fax: 415 345 5575
Address Book Plus; Letter Writer Plus

Powerview / Radius

Praxis / Coy, Gary

Precision Type
47 Mall Dr, Commack NY 11725 5703; 800 248 3668, 516 864 1024, fax: 516 543 5721
PostScript fonts

Premiere / Adobe

Presenter Professional / VIDI

Prodigy
445 Hamilton Av, White Plains NY 10601; 800 PRO DIGY

Profiler *(in Now Utilities)* / Now Software

Prograph / TGS

Pro Tools / Digidesign

ProVue Development
15180 Transistor Ln, Huntington Beach CA 92649; 800 966 7878, 714 892 8199, fax: 714 893 4899
Panorama

Public Folder / Claris

Publish!
501 Second St, Suite 600, San Francisco CA 94107; 800 274 5116 (subscriptions), 415 243 0600, fax: 415 442 1891

Pyro / Fifth Generation

PZM microphone / Radio Shack

QMS
One Magnum Pass, Mobile AL 36618; 800 631 2692, 205 633 4300, fax: 205 633 0116
laser printers

Quadram
1 Quad Way, Norcross GA 30093; 404 923 6666, fax: 404 564 5528
QuadFlextra drive

QuadFlextra drive / Quadram

Quantum Commercial Products
500 McCarthy Blvd, Milpitas CA 95035; 800 624 5545, 408 894 4000, fax: 408 894 3218
hard drives

Quark
1800 Grand St, Denver CO 80203; 800 788 7835, 303 894 8888, fax: 303 894 3395
QuarkXPress; XTensions

QuickDex / Casady & Greene

Quicken / Intuit

QuicKeys & QuickMail / CE Software

QuickTime / Apple

Quote Init / Stein, Lincoln D.

Radio Shack
1500 One Tandy Ctr, Ft Worth TX 76116; 817 390 3011
PZM microphone

Radius
1710 Fortune Dr, San Jose CA 95131; 408 434 1010, fax: 408 434 0127
accelerator boards; monitors

Rocket accelerator cards / Radius

RagTime / MacVonk•Canada

RAM Check / Tim Capps and Mike Friese

Ram Preserves / McLeod, Richard D.

RasterOps
2500 Walsh Av, Santa Clara CA 95051; 800 729 2656, 408 562 4200, fax: 408 562 4065
monitors; video-out NuBus cards

Ray Dream
1804 N Shoreline Blvd, Mountain View CA 94043; 800 846 0111, 415 960 0765, fax: 415 960 1198
JAG; Ray Dream Designer

Reader Rabbit / Learning Co

Ready,Set,Go! / Manhattan Graphics

Real Story series / Odonian

Redgate Communications
660 Beachland Blvd, Vero Beach Fl 32963; 800 333 8760, 497 231 6904, fax: 407 231 6847
Macintosh Product Registry

Redux / Microseeds

Regional Typograhers
229 Bedford Av, Bellmore NY 11710; 800 854 3443, 516 785 4422, fax: 516 785 4173
Font Info

repeaters / Farallon Computing

ResEdit / Apple

Resolve / Claris

Retriever / Exodus

Retrospect / Dantz

R50 drive / Microtech

Ricoh
3001 Orchard Pkwy, San Jose CA 95134; 408 432 8800, fax: 408 432 8372
external hard drives

Rival / Microseeds

Roland
7200 Dominion Cir, Los Angeles CA 90040; 213 685 5141, fax: 213 722 0911
MIDI keyboards; sound modules

RollerMouse / CH Products

Rosenthol, Leonard *(contributor)*
c/o Aladdin Systems
DTPrinter

Rotenstein, John
Box 165, Double Bay, NSW 2028, Australia
Temperament

Rubin, Charles *(author)*
15 Homestead Rd, Sedona AZ 86336

SafeSleep / Steinberg, Bill

Salient Software
124 University Av, Suite 300, Palo Alto CA 94301; 415 321 5375, fax: 415 321 5378
AutoDoubler; DiskDoubler

SAM / Symantec

Sample Editor / McFarlane, Garrick

Sargon V / Activision

SAS Institute
SAS Campus Dr, Cary NC 27513; 919 677 8000, fax: 919 677 8166
JMP

SA 30 amplified speakers / Koss

Sav-O-Matic / Partridge, Bruce

SBT Corp.
One Harbor Dr, Sausalito CA 94965; 800 227 7193, 415 331 9900, fax: 415 331 1951
accounting software

ScanCo
Box 3217, Redmond WA 98073; 800 722 6263, 206 481 5434, fax: 206 485 1255
MacTable

ScanMan / Logitech

ScanTrac / Pixel

Scarab of Ra / Rick Holzgrafe

Schedule+ / Microsoft

Schlumberger Technologies
CAD/CAM Division, 4251 Plymouth Rd, Ann Arbor MI 48106; 800 366 0060, 800 247 2686
MacBravo! Facilities

Scholastic Software
730 Broadway, New York NY 10003; 800 541 5513, 212 505 6006, fax: 212 353 8219
Hidden Agenda: Scholastic Edition

Screen Gems / Microseeds

Scroll Limit / McLeod, Ken

SCSI Accelerator / Magendanz, Chad

SCSI Evaluator / Long, William

SCSI Info / Easterday, Bob

SCSI Probe / Polic, Robert

SCSI Tool / Arborworks

Sculpt 3D / Byte by Byte

UserLand Software
400 Seaport Ct, Suite 202, Redwood City CA 94063; 800 845 1772 (sales), 415 369 6600, fax: 415 369 6618
Frontier

Sector Collector *(in 911 Utilities)* / Microcom

Seiko Instruments
2990 W Lomita Blvd, Torrance CA 90505; 800 873 4508, 310 517 7810, fax: 310 517 8122
monitors; Smart Label Printer Plu

Selby, Michelle *(printing)* / *see* Consolidated Printers

Set Clock / Leitch, Jim

Set Paths / Tomlin, Bruce

SF/O
2239 Franklin St, Bellevue NE 68005; 402 291 0113, fax: 402 291 1211
easyPrint

Shana
9650 20th Av #105, Edmonton AB Canada T6N 1G1; 403 463 3330, fax: 403 463 3343
Informed Designer; Informed Manager

Sharp Electronics
Sharp Plaza Box F1, Mahwah NJ 07430; 201 529 9600, fax: 201 529 9637
inkjet and laser printers

Shelden, Steve *(margin icons)*
Sheldon Graphics, 7810 Paso Robles Av, Van Nuys CA 91406; 818 343 9936

Sherman, Barnard David *(copy-editing)*
2322 Ward St, Berkeley CA 94705; 510 649 8426

Shiva
One Cambridge Center, Cambridge MA 02142; 800 458 3550, 617 252 6300, fax: 617 252 6852
FastPath; NetModem; NetSerial

ShopKeeper Publishing International
Box 38160, Tallahassee Fl 32315; 904 222 8808, fax: 904 668 9916
My DataBase; ShopKeeper Plus

Showplace / Pixar

Shulman Software
1111 W El Camino Real, Suite 109 MAC, Sunnyvale CA 94087 1057; 408 245 1890, fax: 408 245 1891
FontDisplay

Siesta / Welch, Andrew

Sigma Designs
47900 Bayside Pkwy, Fremont CA 94538; 800 845 8086, 510 770 0100, fax: 510 770 2640
monitors; SCSI monitors

Silentwriter Model 95 / NEC

Silhouette / Emac

Silicon Beach */see* Aldus Consumer Div

Silly Noisy House / Voyager Co

Silverlining / La Cie

SimCity Supreme / Maxis

Simply Accounting / Computers Assoc.

Singer, Randy B. *(writer)*
788 21st Av, San Francisco CA 94121; 415 668 5445

Sitka
950 Marina Village Pkwy, Alameda CA 94501; 800 445 8677, 510 769 9669, fax: 510 769 8771
TOPS

SmartKeys / Volaski, Maurice

Smart Label Printer Plus / Seiko

SmartScrap and the Clipper / Portfolio

SnapJot / Wildflower

SndControl / Ettore, Riccardo

Snooper / Maxa

SoftArc Online *(BBS)*
Scarborough ON; modem: 416 609 2250

SoftAT, SoftPC / Insignia

Soft Solutions
907 River Rd #98, Eugene OR 97404; 503 461 1136, fax: 503 461 2005
flyback transformer parts kits

Softsync
800 Douglas Entrance N Tower, Suite 355339, Coral Gables FL 33134; 800 933 2537 (sales), 305 444 0080, fax: 305 443 3255
Accountant Inc

Software Ventures
2907 Claremont Av, Berkeley CA 94705; 800 336 3478, 510 644 3232, fax: 510 848 0885
MicroPhone

Softways
5066 El Roble, San Jose CA 95118; 408 978 9167, fax: 408 448 0620
Mr File

SoundEdit Pro / Macromedia

Sound Mover / Ettore, Richard

Sound Source Unlimited
2985 E Hillcrest Dr, Suite A, Westlake Village CA 91362; 800 877 4778, 805 494 9996, 805 496 4917
Star Trek Collection

Sound Tools II / Digidesign

SoundMaster / Tomlin, Bruce

Spectrum HoloByte
2490 Mariner Square Loop, Alameda CA 94501; 800 695 GAME, 510 522 3584, fax: 510 522 3587
Tetris; Super Tetris; Wordtris

Specular International
Box 888, Amherst MA 01004; 413 549 7600, fax: 413 549 1531
Infini D

SpeedDisk *(in Norton Utilities)* / Symantec

Speedometer / Berfield, Scott

Spelling Coach Professional / Deneba

Spellswell / Working Software

SpinD / Steinberg, Bill

Spinnaker
201 Broadway, Cambridge MA 02139; 800 323 8088 x 555, 617 494 1200, fax: 617 494 0173
Plus

SQIX / Dutil, Marc E.

Stack Runner / Claris

StarController / Farallon

Star Micronics
420 Lexington Av, Suite 2702, New York NY 10170; 800 227 8274, 212 986 6770, fax: 212 286 9063
StarJet SJ 48

Star Trek Collection / Sound Source

StarJet SJ 48 / Star Micronics

StarPak
237 22nd St, Greely CO 80631; 303 353 7650, fax: 303 352 6152
DeskWriter resource version updates

StartupSndInit / Ettore, Riccardo

StatView / Abacus

Stein, John
the TypeBook

Stein, Lincoln D.
44 Boynton St #3, Jamaica Plain MA 02130
Quote Init

Steinberg, Bill
AppleLink: X0542, AOL: BillS NYC
BootMan

Stepping Out / Berkeley Systems

STF Technologies
Junction I70 & Hwy 23, Concordia MO 64020; 816 463 2021, fax: 816 463 7958
FaxSTF

Stingray / CoStar

Storage Dimensions
1656 McCarthy Blvd, Milpitas CA 95035; 408 954 0710, fax: 408 944 1200
Data Cannon

Strata
2 W Saint Geourge Blvd, Suite 2100, St George UT 84770; 800 6 STRATA, 801 628 5218, fax: 801 628 9756
StrataVision 3d

Strategic Conquest / Delta Tao

Streamline / Adobe

Studio/1, /8, /32 / Electronic Arts

Studio Plus Two / Opcode

StudyWare for SAT / Cliffs StudyWare

StuffIt / Lau, Raymond

StuffIt Deluxe and Lite / Aladdin

Stunt Copter / Blehm, Duane

StyleWriter / Apple

Suitcase II / Fifth Generation

SUM *(in Norton Utilities)* / Symantec

SunShine
Box 4351, Austin TX 78765; 512 453 2334
Visual Delights

Super Boomerang *(in Now Utilities)* / Now Software

SuperCard / Aldus

SuperClock! / Christenson, Steve

SuperDisk! / Alysis

SuperDrive / Apple

Super Glue / Portfolio

SuperLaserSpool / SuperMac

SuperMac Technologies
485 Potrero Av, Sunnyvale CA 94086; 800 345 9777, 408 245 2202, fax: 408 735 7250
monitors; SuperLaserSpool; VideoSpigot

SuperMOM / National Tele-Press

SuperMouse / Z Nix

SuperPaint / Aldus

Super QuickDex / Casady & Greene

Super Ruler / Ubillos, Randy

Super Solvers OutNumbered! / Learning Co

Super Tetris / Spectrum Holobyte

Super 3D / Aldus

Supra
1701 Supra Dr SW, Albany OR 97321; 800 727 8772, 503 967 2400, fax: 503 967 2401
SupraFaxModem

Survivor Software
11222 La Cienega Blvd, Suite 450, Inglewood CA 90304; 310 410 9527, fax: 310 338 1406
MacMoney

Sutcliff, Judith
Electric Typographer, 2216 Cliff Dr, Santa Barbara CA 93109; 805 966 7563
display fonts

Swamp Gas / Inline Design

Switchboard / DataDesk

Switcher / Hara, Keisuke

SwivelMan / Macromedia

Symantec
10201 Torre Av, Cupertino CA 95014; 800 441 7234, 408 253 9600, fax: 408 252 4694
GreatWorks; More; Norton Utiltities; SAM; Think C

Symmetry Software
8603 E Royal Palm Rd #110, Scottsdale AZ 85258; 800 624 2485, 602 998 9106, fax: 602 991 0572
Acta; Mariah

SyQuest Technologies
47071 Bayside Pkwy, Fremont CA 94538; 510 226 4000, fax: 510 226 4100
cartridge disk and drive OEM

Systat
1800 Sherman Av, Suite 801, Evanston IL 60201; 708 864 5670, fax: 708/492 3567
Systat

System Connection
441 Eastbay Blvd, Provo UT 84605; 800 877 1985, 801 373 9800, fax: 801 373 9847
cables

System Picker / Aitken, Kevin

Systems Control
Box 788 M, North US #2, Iron Mountain MI 49801; 800 451 6866, 906 774 8000, fax: 906 779 4219
MacGard

Taste / DeltaPoint

Tattle Tale / Hablutzel, Bob

TeachText / Apple

Technology Works *(aka TechWorks)*
4030 Braker Ln W, Suite 350, Austin TX 78759; 800 688 7466, 512 794 8533, fax: 512 794 8520
SIMMs

Teknosys
3923 Coconut Palm Dr, Suite 111, Tampa FL 33619; 800 873 3494, 813 620 3494, fax: 813 620 4039
Help!

TeleTypesetting
311 Harvard St, Brookline MA 02146; 617 734 9700, fax: 617 734 3974
T Script Basic (regular and deluxe)

Teleware
300 Roundhill Dr, Rockaway NJ 07866; 800 322 6962, 201 586 2200, fax: 201 586 8885
M.Y.O.B.; developer of Managing Your Money (see Meca for sales)

Temperament / Rotenstein, John

Tempo / Affinity

Test Pattern Generator / Pina, Larry

Tetris / Spectrum HoloByte

Texas Caviar
3933 Steck Av, Suite B 115, Austin TX 78759; 512 346 7887, fax: 512 346 1393
Annabel's Dream of Ancient Egypt

Texas Instruments
Box 202230, Austin TX 78720; 800 527 3500
MicroLaser PS17

TGS Systems
2745 Dutch Village Rd, Halifax NS Canada B3L 4G7; 800 565 1978, 902 455 4446, fax: 902 455 2246
Prograph

3Com
5400 Bayfront Plaza, Santa Clara CA 95052; 800 638 3266, 408 764 5000, fax: 408 764 5001
Ethernet cards

3M
3M Center, St Paul MN 55144 1000; 800 362 3456, 612 733 1110, product info: 612 733 5454
electronics-sensitive vacuum; floppy drive cleaner

Think C / Symantec

Thumbelina / Appoint

Thunder 7 / Baseline

Thunderware
21 Orinda Way, Orinda CA 94563; 800 628 0693 (sales only), 510 254 6581, fax: 510 254 3047
LightningScan

Thurmon, Paulann *(copy-editing)*
5 Gordon St, Sausalito CA 94965; 415 331 2082

Tidy It Up! / Fiems, Guy

Timbuktu / Farallon

Time Arts
1425 Corporate Center Pkwy, Santa Rosa CA 95407; 800 959 0509, 707 576 7722, fax: 707 576 7731
Oasis

T/Maker
1390 Villa St, Mountain View CA 94041; 415 962 0195, fax: 415 962 0201
ClickArt; EPS images; WriteNow

To Do! / Welch, Andrew

Tomlin, Bruce
15801 Chase Hill #109, San Antonio TX 78256
Set Paths, SoundMaster

TOPS / Sitka

TouchWindow / Edmark

Toyogo
Box 25460, Honolulu HI 96825; 800 869 6469, 808 396 2626, fax: 808 8396 4126
Go Master; Go Junior

TrackMan / Logitech

Transfinite Systems
Box N MIT Branch Post Office, Cambridge MA 02139; 617 969 9570
The Gold Brick

Transport / MicroTech

Trash Chute / Rogers, Melissa

Traveling Software
18702 N Creek Pkwy, Bothell WA 98011; 800 343 8080, 206 483 8088, fax: 206 485 6786
LapLink Mac III

Trimar USA
300 Paterson Plank Rd E, E Rutherford NJ 07073; 800 872 4454, 201 933 0199, fax: 201 933 2371
CompuNet

TrueType / Apple

Truevision
7340 Shadeland Station, Indianapolis IN 46256 3919; 800 858 8783, 317 841 0332, fax: 317 576 7700
video-out NuBus cards

T Script Basic / TeleTypsetting

TurboMouse / Kensington

Turbo Trax / Passport Designs

TwinIt / Golden Triangle

II In A Mac / Computer:Applications

TypeBook, the / Stein, John

TypeReader / ExperVision

Type Reunion / Adobe

TypeStyler / Brøderbund

Typist Plus Graphics / Caere

Ubillos, Randy
c/o Computer:Applications
Super Ruler

UltraPaint / Deneba

UNIC
1330 Beacon St, Suite 320, Brookline MA 02146; 617 731 1766, fax: 617 731 8089
Architrion II

Unity 1000 / LaserMaster

UnMouse / MicroTouch

UnScrolly / Miserey, Frédéric

Upfront / Alias Research

U.S. MicroLabs
1611 Headway Cir Bldg #3, Austin TX 78754; 512 339 0001, fax: 512 339 0002
FontSizer

Vacuum / 3M

The Valis Group
Box 422, Point Richmond CA 94807; 510 236 4124, fax: 510 236 0388
VG Shaders + VG Looks

Varcon Systems
10509 San Diego Mission Rd, Suite K, San Diego CA 92108; 619 563 6700, 619 563 1986
Great Gantt!

Varityper
11 Mt Pleasant Av, East Hanover NJ 07936; 800 631 8134, 201 887 8000 ext 999
imagesetters; VT600W (laser printer)

Venkatesh *(graphic production)*
510 465 9046

Ventana Press
Box 2468, Chapel Hill NC 27515; 800 877 7955 (faxed orders only), 919 942 0220, fax: 919 942 1140
Macintosh books

Ventura Software
15175 Innovation Dr, San Diego CA 92128; 800 822 8221, 619 673 70172, fax: 619 673 7672
Ventura Publisher

Verbum
670 7th Av 2nd Fl, San Diego CA 92101; 619 233 9977, fax: 619 233 9976

VG Shaders + VG Looks / Valis

Video Toaster / NewTec

VideoShop / Diva

VideoSpigot / SuperMac

VIDI *(Visual Development Information, Inc.)*
16309 Doublegrove St, La Puente CA 91744; 818 918 8834, fax: 818 918 9935
Presenter Professional

Virtual / Connectix

Virtus
117 Edinburgh S, Suite 204, Cary NC 27511; 800 847 8871 (sales only), 919 467 9700, fax: 919 460 4530
WalkThrough

Vision / Opcode

Visual Delights / SunShine

Voice Impact (regular and Pro) / Articulate

Voice Record / Articulate

Volaski, Maurice
18201 Henry Av, Philadelphia PA 19128
SmartKeys

The Voyager Company
1351 Pacific Coast Hwy, Santa Monica CA 90401; 800 446 2001, 310 451 1383, fax: 310 394 2156
AmandaStories (Vol 1–4); A Silly Noisy House

VT600W / Varityper

Wacom Technologies
501 SE Columbia Shores Blvd, Suite 300, Vancouver WA 98661; 800 922 6613, 206 750 8882, fax: 206 750 8924
Wacom tablets

WalkThrough / Virtus

Wavicle / Fyock, Lee

The Weigand Report / Doucette's

Welch, Andrew
Ambrosia, Box 23140, Rochester NY 14692
Blackout; Clarity; FlashWrite; Siesta; To Do!

WetPaint / Dubl-Click

When in Time is Carmen Sandiego? / Brøderbund

Where in ___ is Carmen Sandiego? / Brøderbund

White Knight / FreeSoft

Widgets *(in MockPackage Plus)* / CE Software

Wildflower Software
21W171 Coronet Rd, Lombard IL 60148; 708 916 9360, fax: 708 916 0883
SnapJot

WillMaker / Nolo

Winograd, Ken
2039 Country Club Dr, Manchester NH 03102; 603 625 1049
Hangman Plus

Word / Microsoft

Word Finder Plus / Microlytics

WordMaker / New Horizons

WordPerfect Corp.
1555 N Technology Way, Orem UT 84057; 800 451 5151, 801 225 5000, fax: 801 222 5077
WordPerfect; WordPerfect Office

Wordtris / Spectrum Holobyte

Working Software
Box 1844, Santa Cruz CA 95061; 800 229 9675, 408 423 5696, fax: 408 423 5699
Findswell; Last Resort; Lookup; Spellswell

World Class Fonts / Dubl-Click

Wraptures One / Form & Function

WriteMove / GCC

WriteNow / T/Maker

WYSIWYG Menus *(in Now Utilities)* / Now Software

Xante
2559 Emogene St, Mobile AL 36606; 800 926 8839, 205 476 8189, fax: 205 476 9421
AccelaWriter

Xstyle / Em Software

Yamaha
6600 Orangethorpe Av, Buena Park CA 90620; 714 522 9011
MIDI keyboards; tone generators

Zedcor
4500 E Speedway, Suite 22, Tucson AZ 85712; 800 482 4567, 602 881 8101, fax: 602 881 1841
Zedcor Desk

Z Nix
211 Erie St, Pomona CA 91768; 714 629 8050, fax: 714 629 4792
SuperMouse

Z Term / Alverson, David P.

Zync / Batista, Ricardo

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Index

The extensive glossary (pp. 997–1065) isn't indexed, since it's already in alphabetical order. If you're looking for a definition, be sure to look in the glossary as well as the index—in fact, it probably makes sense to look there first. Page numbers in **boldface** *indicate extended or important discussions (including whole sections and chapters on the subjects cited).*

With a few exceptions, keyboard commands are indexed by the function they perform, rather than by the keystrokes that generate them. They also appear in the entry keyboard commands. *Other commands are simply indexed under their names (as well as by function).*

*Icons and symbols are indexed by name and/or category, as well as under their main headings—*icons *and* signs and symbols. *Entries for margin icons are subdivided by chapters (and by sections, where necessary). Entries for contributors aren't subdivided at all, to save space.*

Entries are alphabetized as if spaces, hyphens, and parentheses didn't exist; thus macros *comes before* Mac SE, e-mail *comes before* em dashes *and* labels (electronic) *comes after* Labels Control panel. *An exception to this rule is single-letter names followed by parenthetical descriptions; thus* C (programming language) *and* K (kilobytes) *come first in their sections of the alphabet.*

Numbers are alphabetized as if spelled out according to the most common pronunciation; for example, the entry for 1.4 MB floppy disks is alphabetized as if written one-point-four MB floppy disks. *Entries are only capitalized to indicate proper names (or other words that are always capitalized).*

Appendix B isn't indexed, but the companies and products listed there are indexed when they appear elsewhere in the book. All the illustrations are indexed (as always), but the acknowledgments aren't. For those who remember information by the punch line, jokes have also been indexed (unless they were above my head or below my humor threshold). After all, this is the index to the Macintosh Bible. It's supposed to be fun.—Ty Koontz

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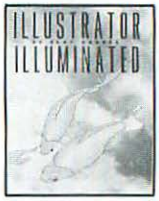

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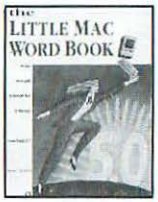

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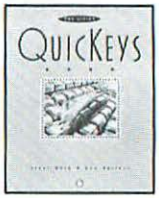

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